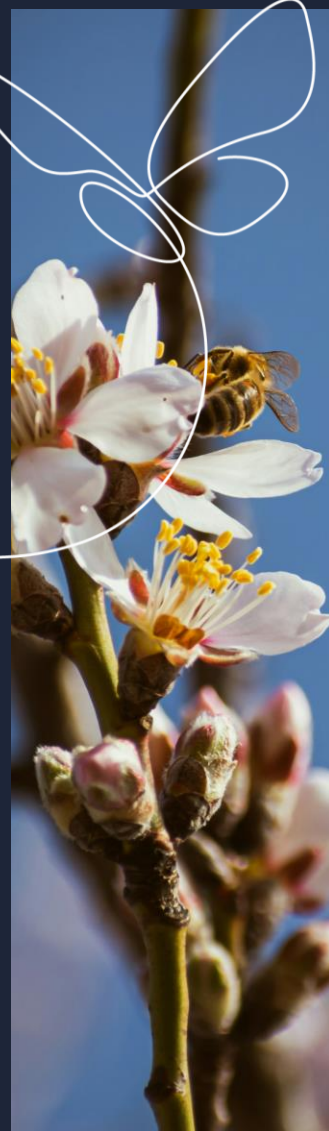




2024

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ROOTED TOGETHER  
THE ALMOND CONFERENCE





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## ROOTED TOGETHER THE ALMOND CONFERENCE

# What to Do with Unplanted Land?

**Moderator:** Michael Roots (ABC)

**Speakers:** Mike Wade (California Farm Water Coalition),  
Mike Tietze (East Turlock GSA), Anja Raudabaugh  
(Western United Dairies), Joe Choperena (Sustainable  
Conservation), Bret Sill (Almond Grower)





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## What to Do with Unplanted Land?

**Speaker:** Mike Wade (California Farm Water Coalition)





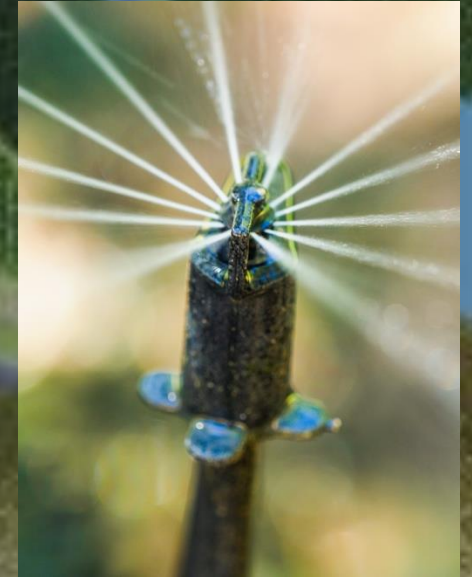
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# ROOTED TOGETHER

## THE ALMOND CONFERENCE

### The Sustainable Groundwater Management Act (SGMA)

Mike Wade  
California Farm Water Coalition



# Sustainable Groundwater Management Act (SGMA)



- The act consists of three main bills: SB 1168, AB 1739, and SB 1319
- Signed into law by Governor Jerry Brown in September 2014.
- Aimed to achieve sustainable groundwater management by 2042
- Emphasized local control through Groundwater Sustainability Agencies (GSAs)

## Key Components

- Formation of GSAs for medium and high-priority groundwater basins
- Development of Groundwater Sustainability Plans (GSPs)
- New authorities granted to GSAs for groundwater management

## Current Status

- 71 basins have submitted approved GSPs
- 13 basins had plans deemed incomplete, given 6 months to address issues
- 6 basins from 2020 critically overdrafted plans deemed inadequate
- Implementation ongoing, with sustainability target set for 2040s



# Challenges and Opportunities

- Balancing local control with state oversight
- Addressing potential conflicts with existing water rights
- Ongoing assessment of SGMA's effectiveness and need for revisions



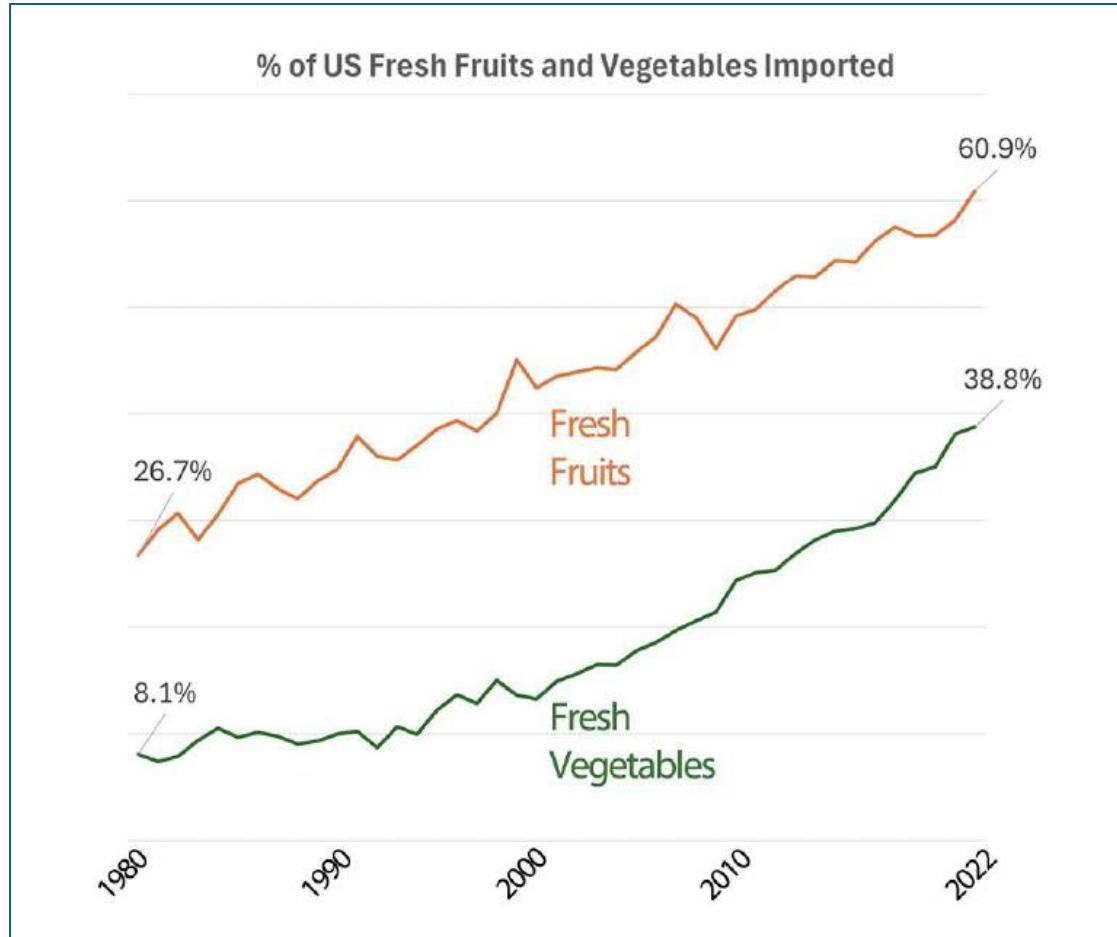
## U.S. Food Supply



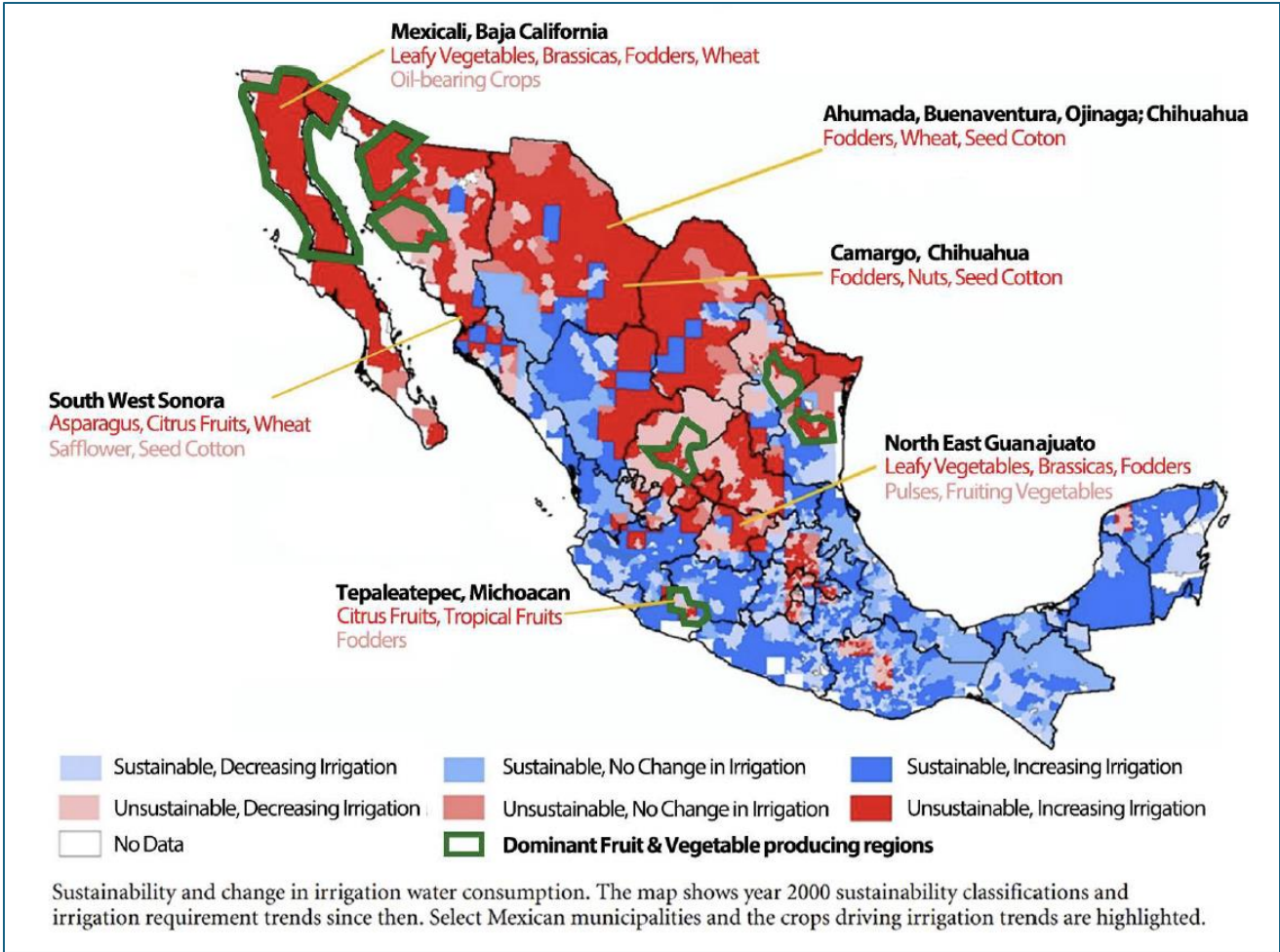
- Over a third of the U.S.-produced vegetables and over three-quarters of the country's fruits and nuts are grown in California. (CDFA)
- 500,000 acres or more are expected to be fallowed as a result of SGMA



**At a time when California is projected to lose half a million acres of farmland due to groundwater regulations and inadequate surface supplies, our growing reliance on foreign-produced food is now threatened by widespread overuse of water supplies in Mexico.**



- Americans pay 11% of their income on food, the highest in over 30 years.
- Food production must double by 2050 to meet the demand of the world's growing population.
- Overseas food producers are not required to meet the same health and safety standards that exist in California.



### Local Fruit and Vegetable Production is Struggling

California’s farms produce nearly 70% of the nation’s domestically grown fruits and vegetables, but imports now account for more than 38% of the U.S. supply of fresh vegetables, and 60% of fresh fruits.

Of imports, Mexico accounts for 69% of fresh vegetables and 51% of fresh fruits.

California water restrictions, high business costs, and 30 years of trade policy have pushed domestic food production south of the border to Mexico where water supplies have become largely unsustainable.

# Is this America’s Food Policy?

farmwater.org



2024

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THANK YOU

ALMOND BOARD OF CALIFORNIA



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## What to Do with Unplanted Land?

**Speaker:** Mike Tietze (East Turlock GSA)





# Integrated Land Repurposing Strategies for Sustainable Groundwater Management

Presented at:

*The Almond Conference*

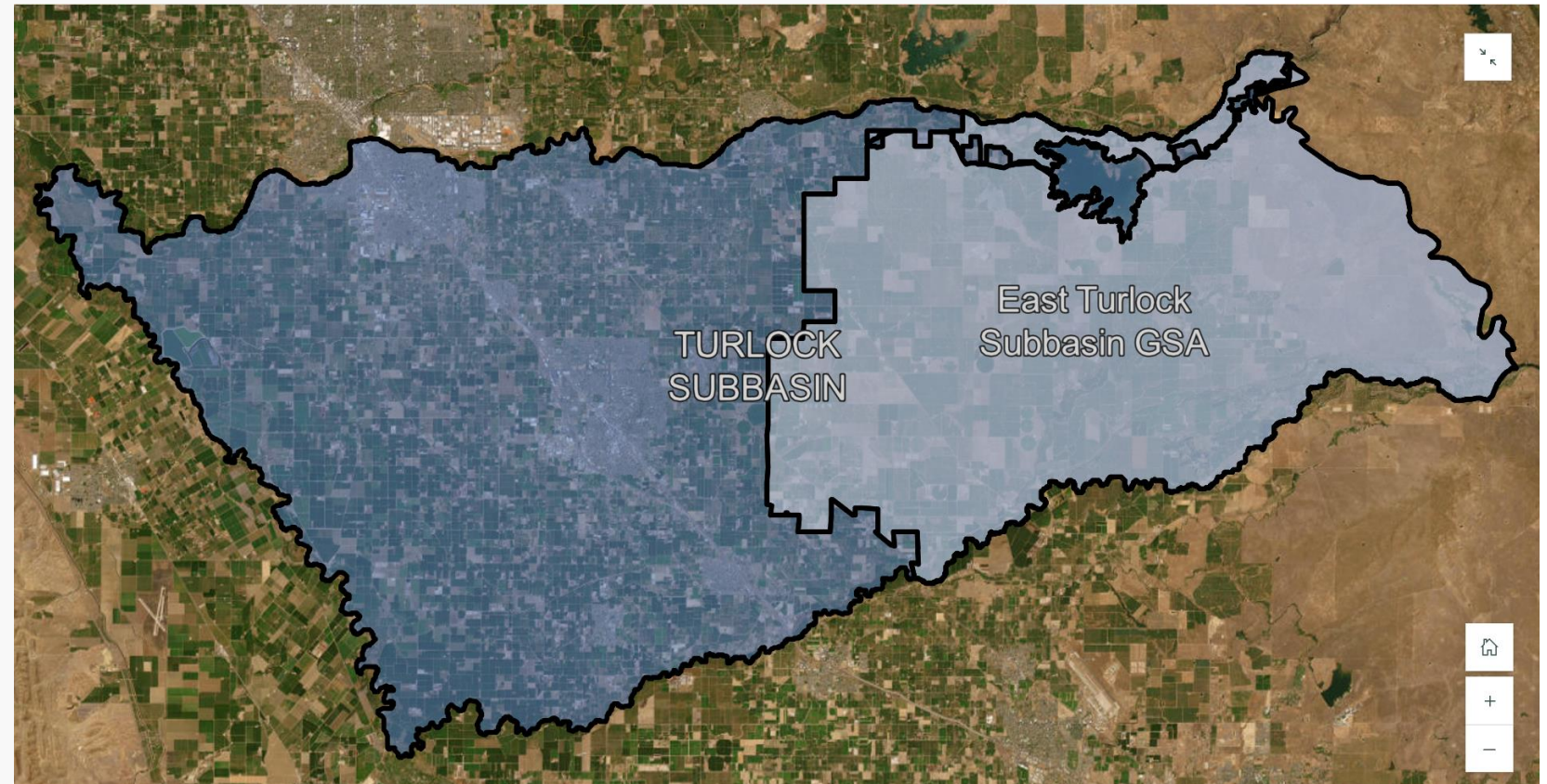
December 10, 2024

# Overview of the Turlock Subbasin

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One GSP adopted and being implemented jointly with by East Turlock Subbasin GSA and West Turlock Subbasin GSA.

Our GSP was initially found incomplete by DWR and a revised GSP was submitted July 2024.



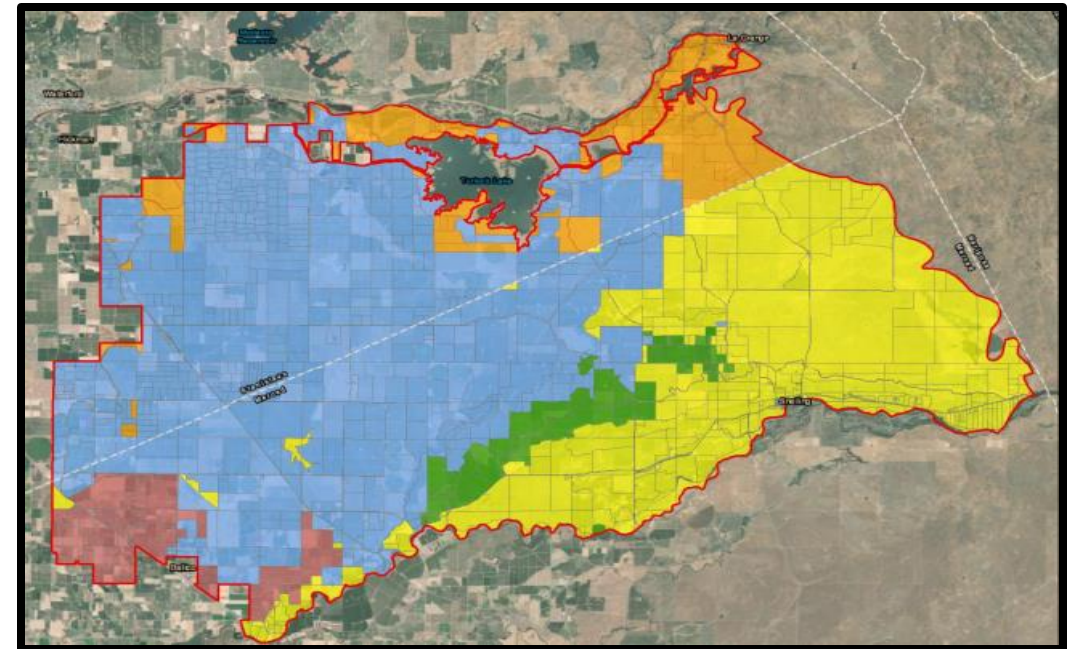
# OVERVIEW OF THE EAST TURLOCK SUBBASIN GSA



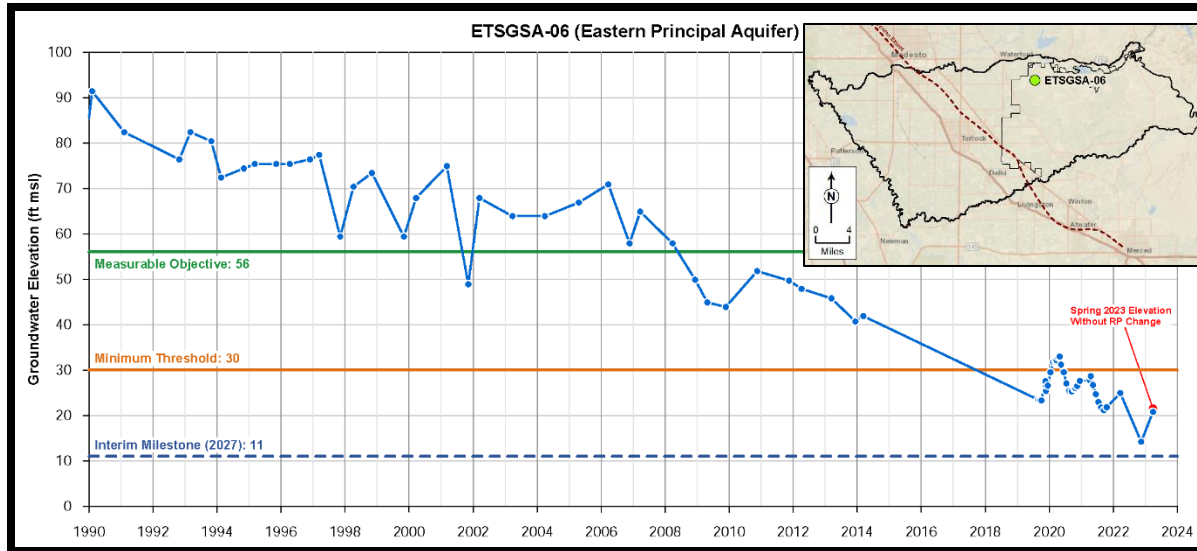
- ~90,000 acres of high value ag land; Mostly permanent crops (>60% Almonds)
- River-bounded but little surface water available
- Productive aquifers, low recharge

## ■ Joint Powers Authority

- ✓ Eastside Water District
- ✓ Ballico-Cortez Water District
- ✓ Merced Irrigation District
- ✓ Merced County
- ✓ Stanislaus County

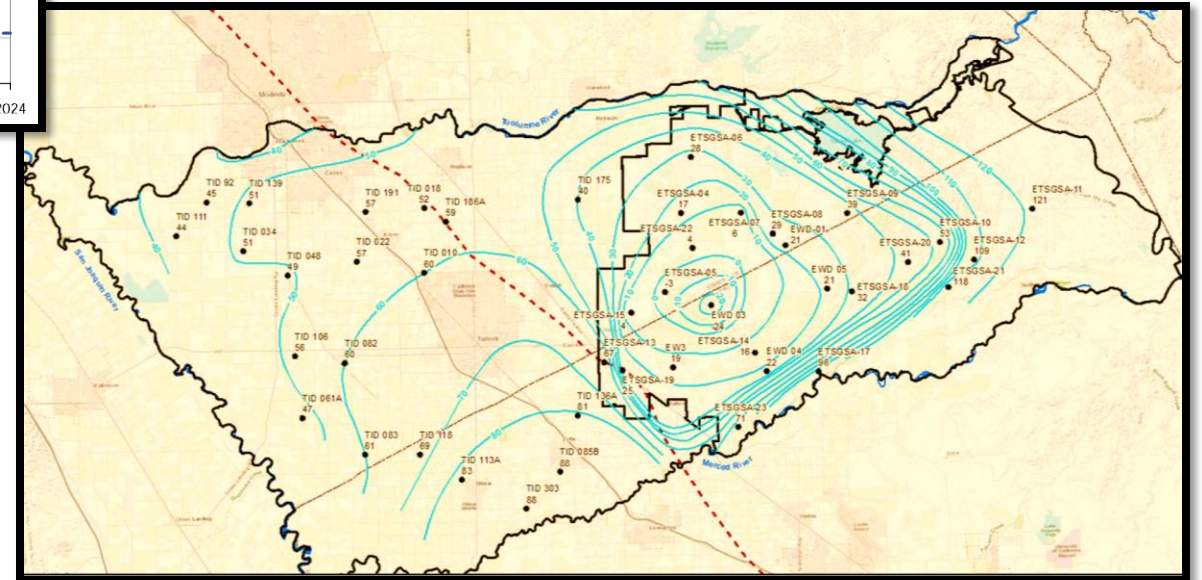


# ETSGSA GROUNDWATER CONDITIONS



- Declining groundwater levels and depletion of river discharge
- Below GSP Minimum Thresholds
- Groundwater demand exceeds sustainable yield by an estimated net ~96,000 AFY

- Revised GSP requires we arrest groundwater decline by 2027 and recover to MTs by 2032
- Sustainable Yield by 2042





# THE CHALLENGE



*Maintain local control and a viable ag economy while decreasing groundwater demand to meet GSP targets*

- ✓ Accounting Agreement with TID will provide up to 25,000 ac-ft/year average out of district surface water.
- ✓ The remaining ~70,000 ac-ft/year net decrease must be met mainly through demand reduction.
- ✓ We estimate approximately 22,000 acres of cultivated land need to be transitioned to non-irrigated use.
- ✓ Land use changes of this scale are unheard of without extensive planning and mitigation to avoid adverse impacts ...

## *Guiding Approach Objectives*

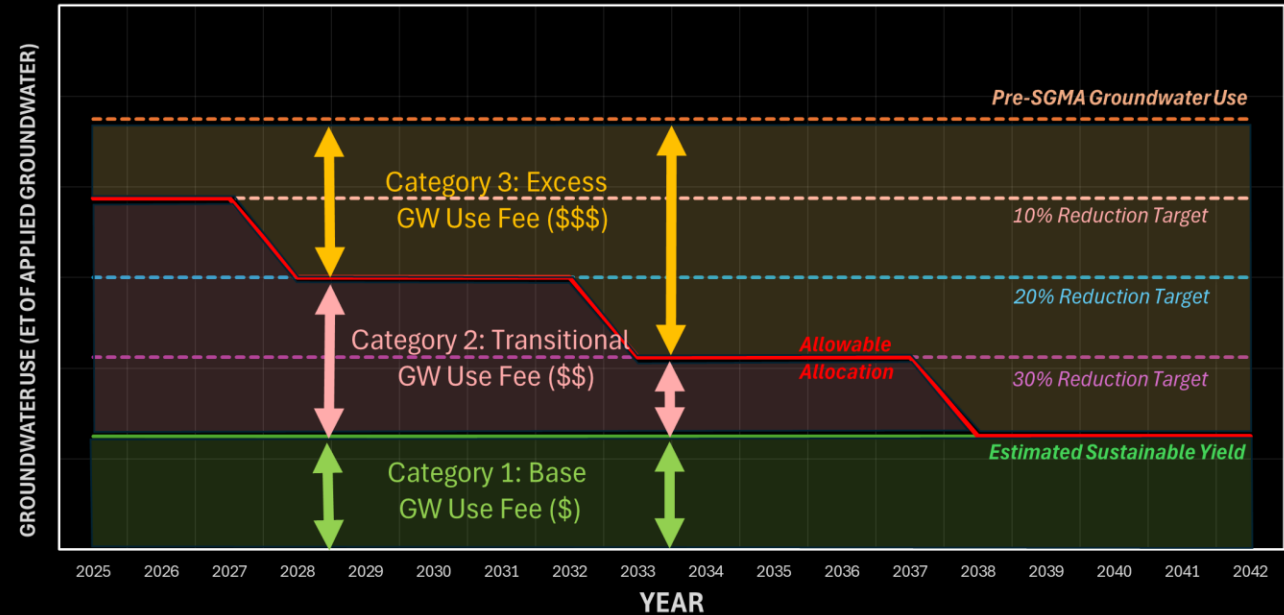
### Integrated agricultural land use planning to facilitate required changes under SGMA:

- ✓ Build a multi-benefit land repurposing strategy for demand reduction that is integrated into working agricultural operations and landscapes.
- ✓ Develop a companion rotational following program by extending the time between orchard replanting.
- ✓ Adopt balanced financing and incentive programs.
- ✓ Preserve high value agricultural land for the benefit of local communities, economies, and the environment.
- ✓ Promote grower-implemented solutions from a menu of options for flexibility, adaptability, optimized ROI and long-term success.

# Lots of Moving Pieces:

- Phased groundwater use reduction; Prioritize demand reduction through decreasing allocations
- Fee Program to fund projects and management actions
- MLRP and Land Fallowing: 5,000 acres by 2027; ~22,000 acres by 2042
- Groundwater Accounting Platform
- Well Mitigation Program
- Rules & Regulations

GROUNDWATER USE FEE FRAMEWORK



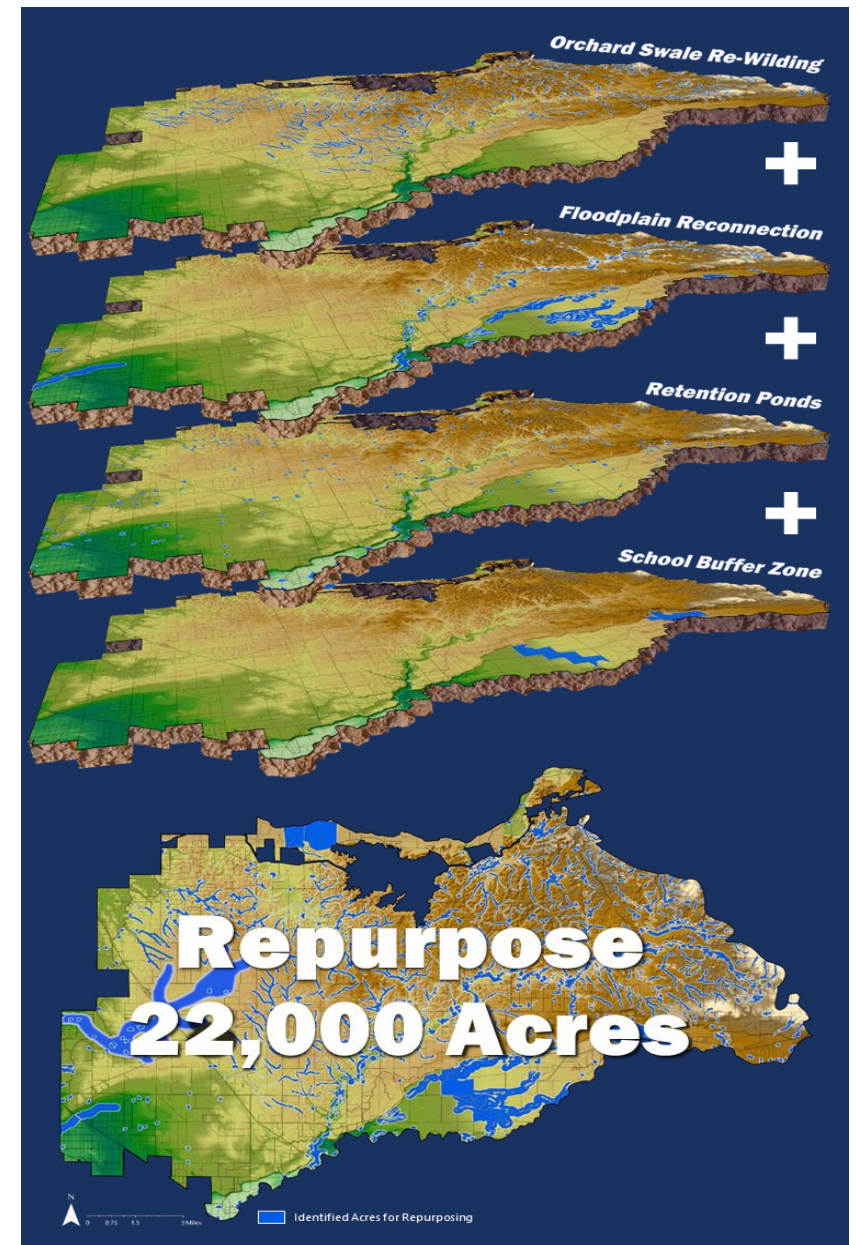
GROUNDWATER USE REDUCTION FRAMEWORK AND PROJECTED USE

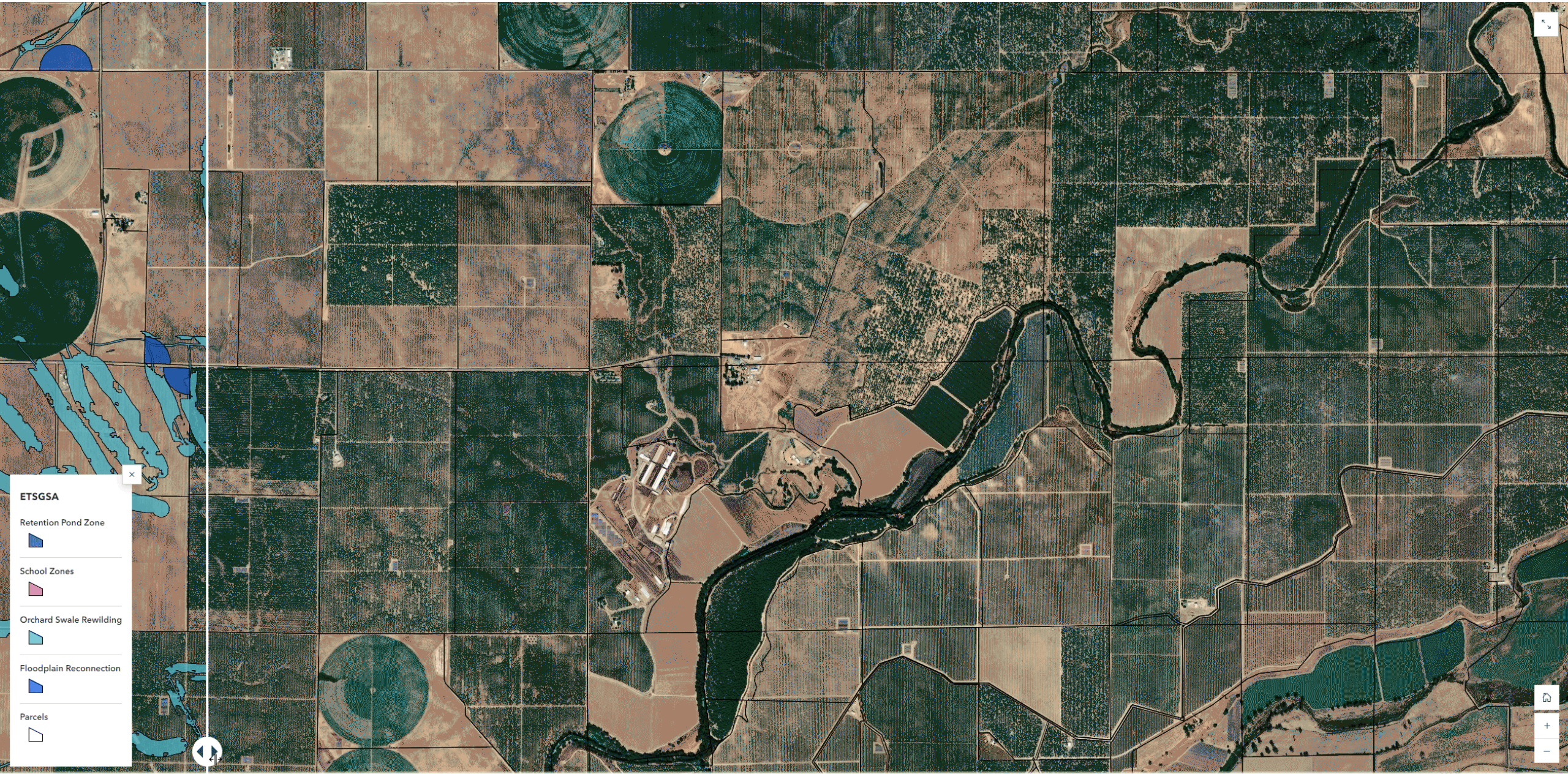




# MLRP Strategy:

- Repurposing integrated into a working landscape
- Menu of options that can be implemented by growers to re-imagine their operations
- Standard specifications for regional implementation
- Programmatic permitting
- Incentive payments leading to long-term change





**ETSGSA**

Retention Pond Zone



School Zones



Orchard Swale Rewilding



Floodplain Reconnection



Parcels



# Water budget benefits of winter cover cropping depend on many factors

## More certain

- More infiltration
- Less runoff
- Improved capture and retention of rainfall

## Less certain

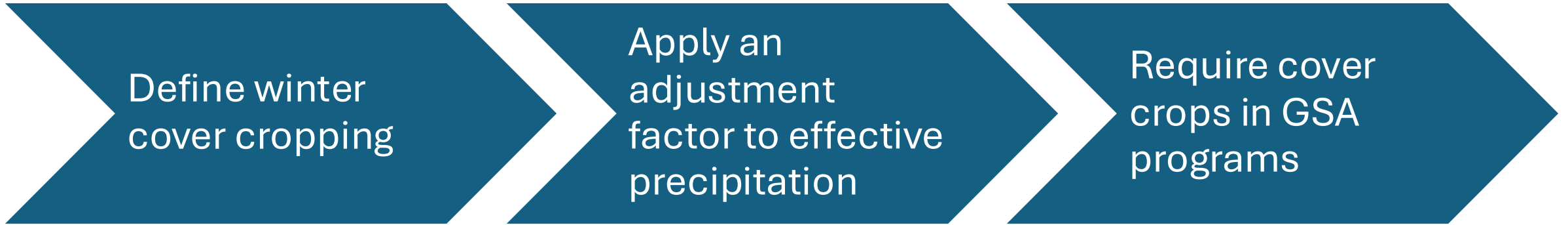
- More ET in the winter
- More fog & dew capture
- More percolation

## Extent depends on

- Climate
- Context
- Historic and current management

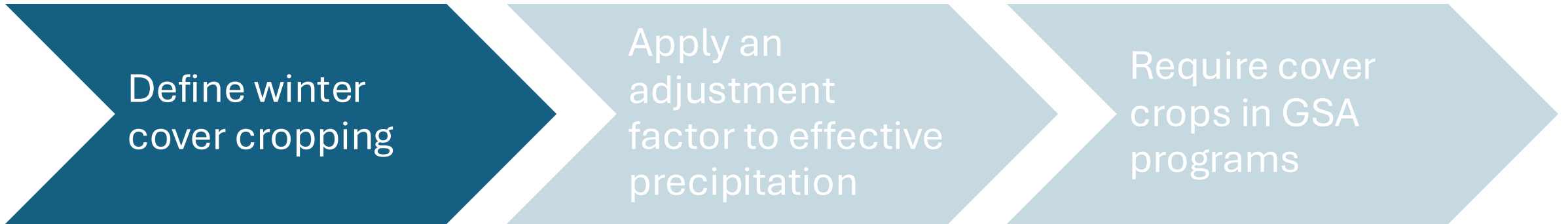


# ETSGSA's Approach to Cover Cropping



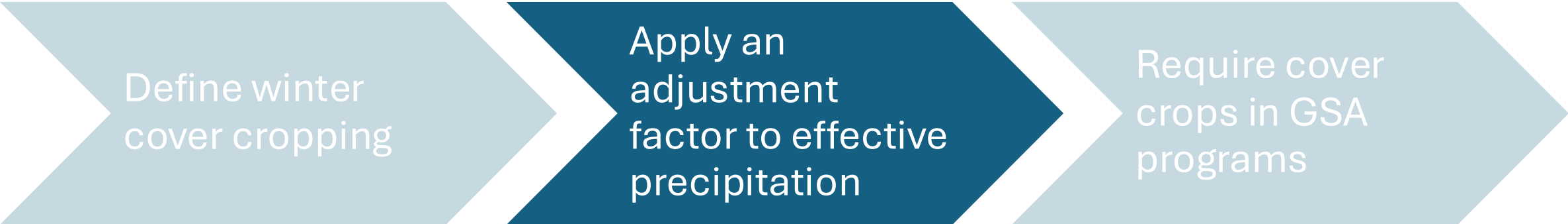


# ETSGSA's Approach to Cover Cropping



**“Cover Crop(s)”** or **“Cover Cropping”** means growing and managing vegetation between rows of perennial crops or seasons of annual crop production, with the purpose of protecting the soil surface and promoting infiltration. Cover cropping shall occur for at least 5 consecutive months between November and April. Cover crops can be any mixture of annual or perennial species, including resident and planted vegetation or dryland crops, and are not irrigated.

# ETSGSA's Approach to Cover Cropping



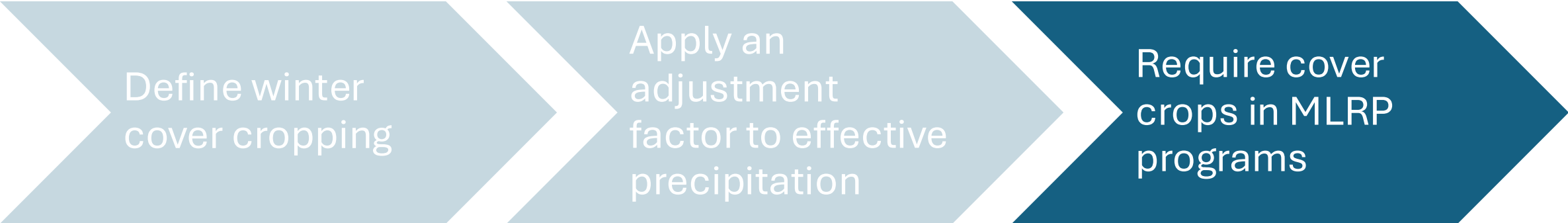
**Adjustment Factor:** 20% less runoff and more soil moisture holding capacity

Year Type	Effective Precipitation	Adjusted Effective Precipitation for Cover Cropping
Wet	0.55	0.66
Normal or Dry	0.71	0.85

**Maximum Effective Precipitation Cap**

12 inches

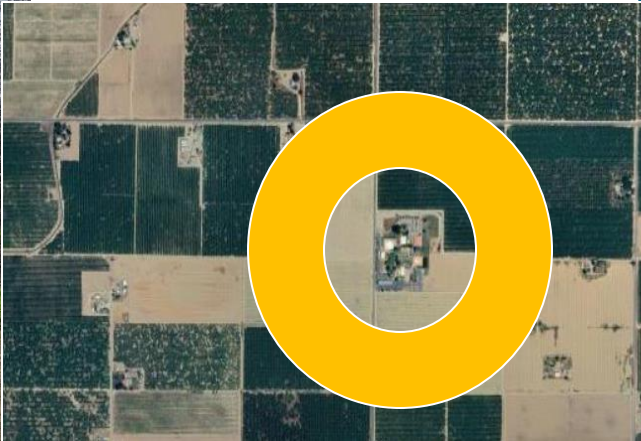
# ETSGSA's Approach to Cover Cropping



**Orchard swale re-wilding**



**Buffer zones around schools**



**Floodplain reconnection**



**Fallowing between plantings**

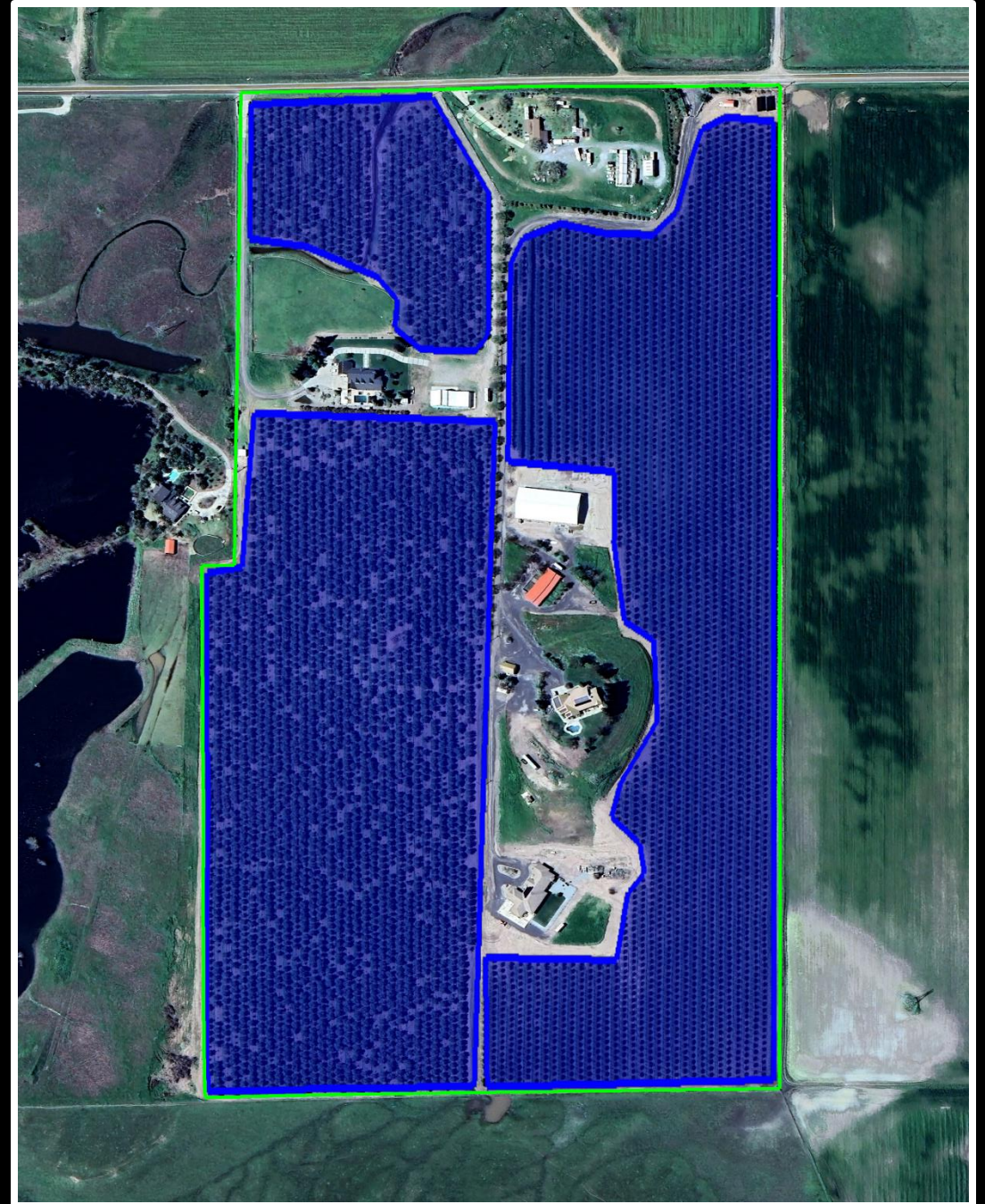


# Incentive Payment Approach

Practice	EQIP Rate Year 1-3 (\$/acre)	Base Rate Year 4-10 (\$/acre)	Weighted Average Incentive Payment (\$/acre)
Fallowing with Beneficial Cover Cropping		\$730	<b>\$730</b>
Orchard Swale Rewilding	\$1,775	\$730	<b>\$1,040</b>

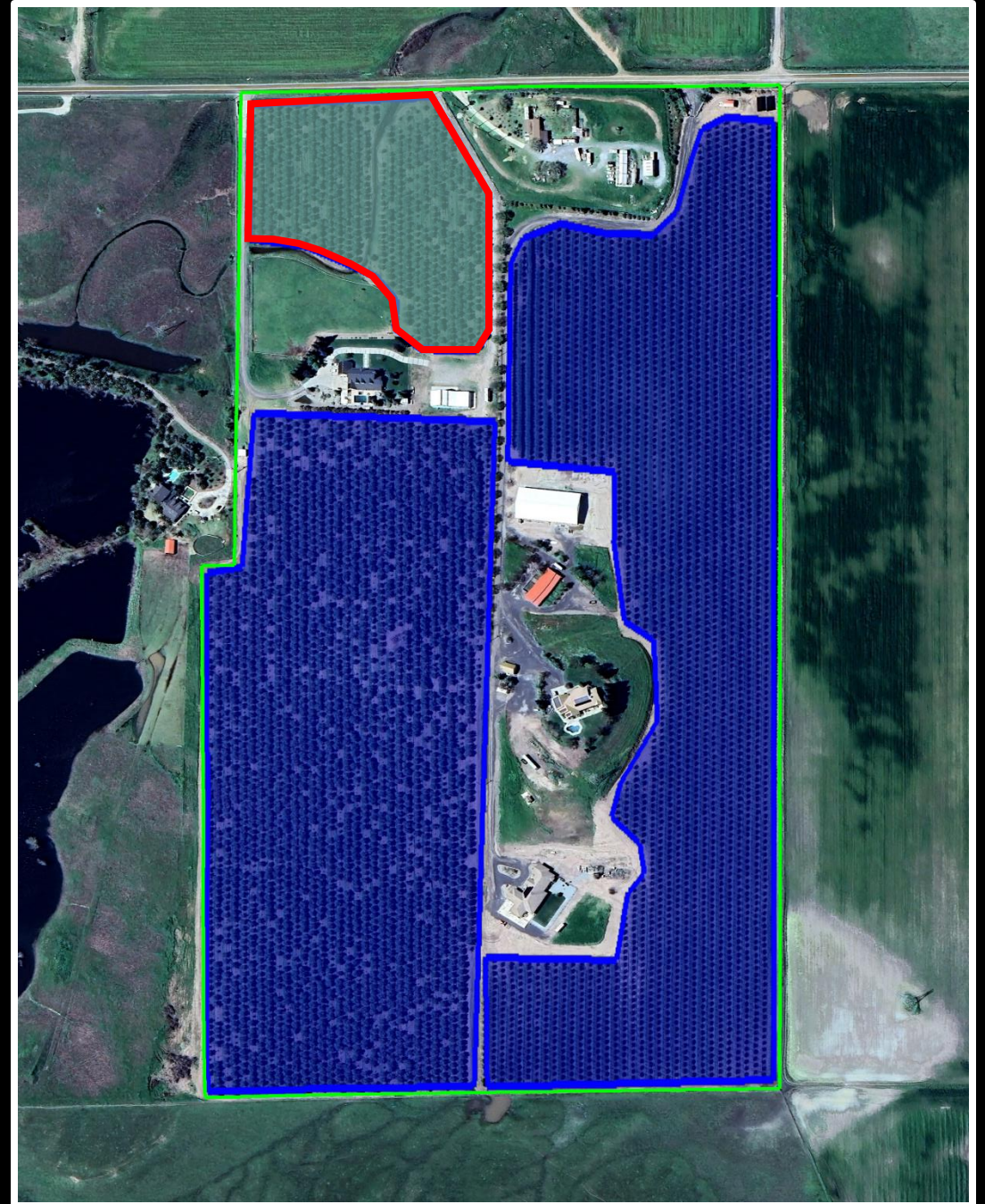
# Fee Calculation for a Hypothetical Parcel @20% Reduction Target (starting 2028)

- Parcel Acreage = 60 acres
- Irrigated Field Acreage = 50 acres
- Allocation @ 20% Reduction Target =  
 $1.4 \text{ ft ET} \times 60 \text{ acres} = 84 \text{ acre-ft}$
- Groundwater Use =  
 $2.3 \text{ ft ET} \times 50 \text{ acres} = 115 \text{ acre-ft} = 1.9 \text{ ft/parcel acre}$
- Fee Calculation:
  - Category 0:  $0.5 \text{ ft} \times 60 \text{ acres} = 30 \text{ af} @ \$0/\text{af} = \$0$
  - Category 1:  $0.6 \text{ ft} \times 60 \text{ acres} = 36 \text{ af} @ \$57.81/\text{af} = \$2,081.16$
  - Category 2:  $0.3 \text{ ft} \times 60 \text{ acres} = 18 \text{ af} @ \$138.61/\text{af} = \$2,494.98$
  - Category 3:  $31 \text{ af} @ \$320.66/\text{af} = \$9,940.46$
  - Total fee = \$14,516.60 or \$290.33/irrigated acre



# Fee Calculation for a Hypothetical Parcel @20% Reduction Target and 10 Acres MLRP

- Parcel Acreage = 60 acres
- Irrigated Field Acreage = 50 acres – 10 acres = 40 acres
- Allocation @ 20% Reduction Target =  
 $1.4 \text{ ft ET} \times (60-10) \text{ acres} = 70 \text{ acre-ft}$
- Groundwater Use =  
 $2.3 \text{ ft ET} \times 40 \text{ acres} = 92 \text{ acre-ft} = 1.9 \text{ ft/parcel acre}$
- Fee Calculation:
  - Category 0:  $0.5 \text{ ft} \times 50 \text{ acres} = 25 \text{ af} @ \$0/\text{af} = \$0$
  - Category 1:  $0.6 \text{ ft} \times 50 \text{ acres} = 30 \text{ af} @ \$57.81/\text{af} = \$1,734.30$
  - Category 2:  $0.3 \text{ ft} \times 50 \text{ acres} = 15 \text{ af} @ \$138.61/\text{af} = \$2,079.15$
  - Category 3:  $22 \text{ af} @ \$320.66/\text{af} = \$7,054.52$
  - Incentive Payment:  $10 \text{ acres} \times \$732/\text{acre} = \$7,320$
  - Total fee =  $\$3,547.97$  or  $\$88.70/\text{irrigated acre}$





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## What to Do with Unplanted Land?

**Speaker:** Anja Raudabaugh, Western United Dairies





# LandFlex

WESTERN **UNITED** DAIRIES

**Anja Raudabaugh**

Chief Executive Officer, Western United Dairies

[anja@wudairies.com](mailto:anja@wudairies.com)



# About LandFlex

- LandFlex is a voluntary pilot program, developed during the drought, to provide immediate protection of rural at-risk water systems, protection of land subsidence, and to make advancements in groundwater sustainability to achieve climate resiliency in the Central Valley.
- The state Department of Water Resources awarded \$25 million in grants to Groundwater Sustainability Agencies (GSAs) to work directly with interested growers in 6 critically overdrafted basins to temporarily fallow agricultural lands to provide immediate benefits for vulnerable domestic wells.
- Initially designed to combat drought conditions, the program has demonstrated remarkable versatility by providing flood protection and identifying active recharge potential during critical wet periods.



LandFlex

# About LandFlex

The 2023 LandFlex Pilot Program demonstrated versatility with the following measurable results:

- A **practical tool for protection of vulnerable drinking water wells/systems and land subsidence,**
- An **innovative solution to eliminate groundwater overdraft and achieve immediate compliance with** the Sustainable Groundwater Management Act (**SGMA**), and
- Flexibility to **develop long-term groundwater recharge capability and provide real-time flood control and protection of property.**



**LandFlex**

# A Tool for SGMA Compliance

- **LandFlex accelerates SGMA compliance**, helping growers plan ahead, align with sustainability goals, and explore innovative farming methods.
- **LandFlex calls for immediate and permanent cessation of groundwater overdraft on enrolled lands**, ensuring long-term groundwater sustainability and the continued resilience of the state's water resources and infrastructure.



**LandFlex**

# Infrastructure Improvements & Protections

A multifaceted tool, LandFlex is also an infrastructure protection program:

- **Protecting critical infrastructure by preventing additional subsidence** on lands near the CA. Aqueduct and Friant Kern Canal.
- Enhancing water conveyance systems thus **protecting public and private drinking water sources**

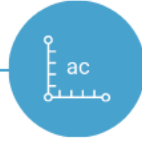


**LandFlex**

# Phase 1

## Participating GSAs:

- Greater Kaweah
- Eastern Tule
- Madera



Acres Enrolled

**1,076 Acres**



Grant Total

**\$6,560,000**

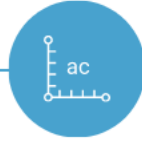


**LandFlex**

# Phase 2

## Participating GSAs:

- Lower Tule
- Pixley
- Westlands



Acres Enrolled

**3,241 Acres**



Grant Total

**\$16,772,684**



**LandFlex**

# Program Results

**In less than a year, LandFlex has save more water than any other SGMA program**

- **Immediate aquifer savings 13,199 AF** through one year following
- **Permanently Retired Overdraft 63,043 AF** enrolled acres have a lien placed with no overdraft capability
- **Protect Key Flood Prone Communities and Water Recharged – 22,471 AF** program has proven climate adaptabilty
- **Protected 16,512 home domestic wells** in 6 critically overdrafted basins through following priority



**LandFlex**

# Takeaways

- **Groundwater IS infrastructure.**
- **Subsidence/Aqueduct Prevention**
- **Managed Aquifer Recharge**
- **Expanded scope:** Addresses drought, groundwater sustainability, land-subsidence, active recharge, flood protection, and food security.
- **Multi-benefit approach:** Balances water source protection and sustainable agriculture.
- **Keep Working Lands in Production**





# Takeaways

- **SGMA-compliant:** Drives climate-conscious actions through flexible land management.
- **Collaborative impact:** Combines voluntary efforts and innovative strategies to deliver measurable results.
- **Key DWR initiative:** Critical for drought protection, sustainable water management and climate resilience.
- The program's **cost-effectiveness** – **\$230 per acre-foot** – for water, demonstrates it is an effective public investment for the many benefits actualized.



LandFlex



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## What to Do with Unplanted Land?

**Speaker:** Joe Choperena (Sustainable Conservation)



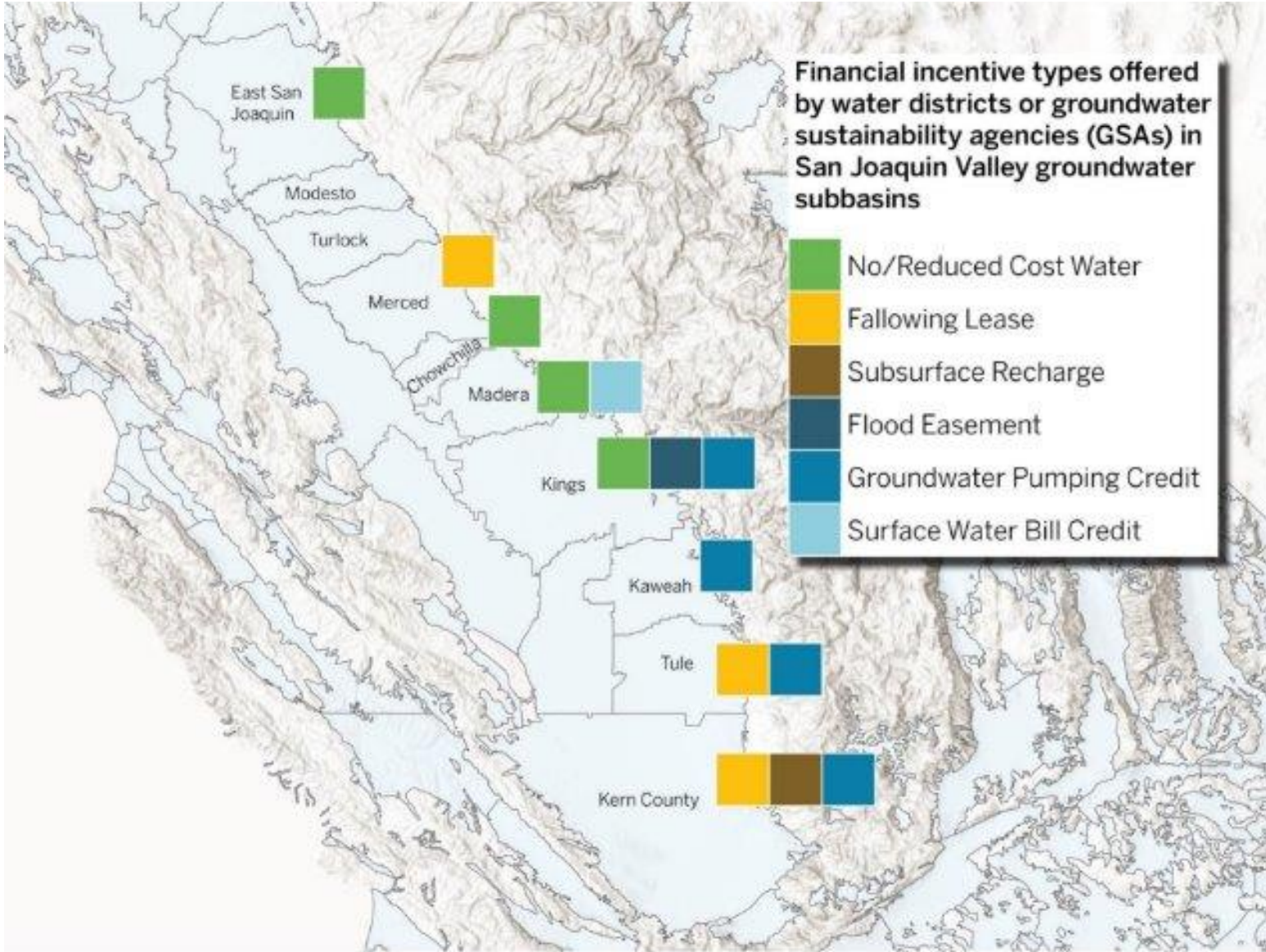


Sustainable Conservation

# Recharge Incentives, Strategies & Methods

2024 Almond Conference  
December 10, 2024

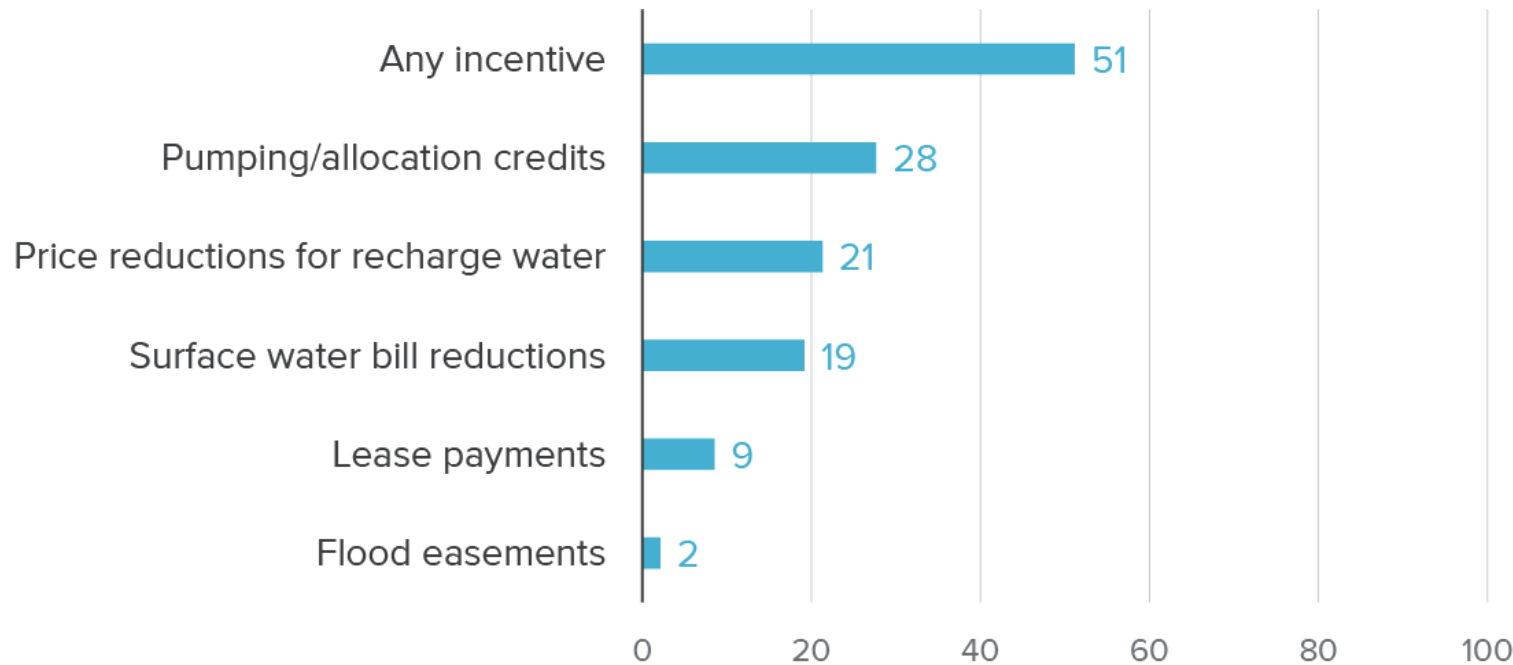
# Financial Incentive Types



# Financial Incentives: Key Driver for Grower Participation

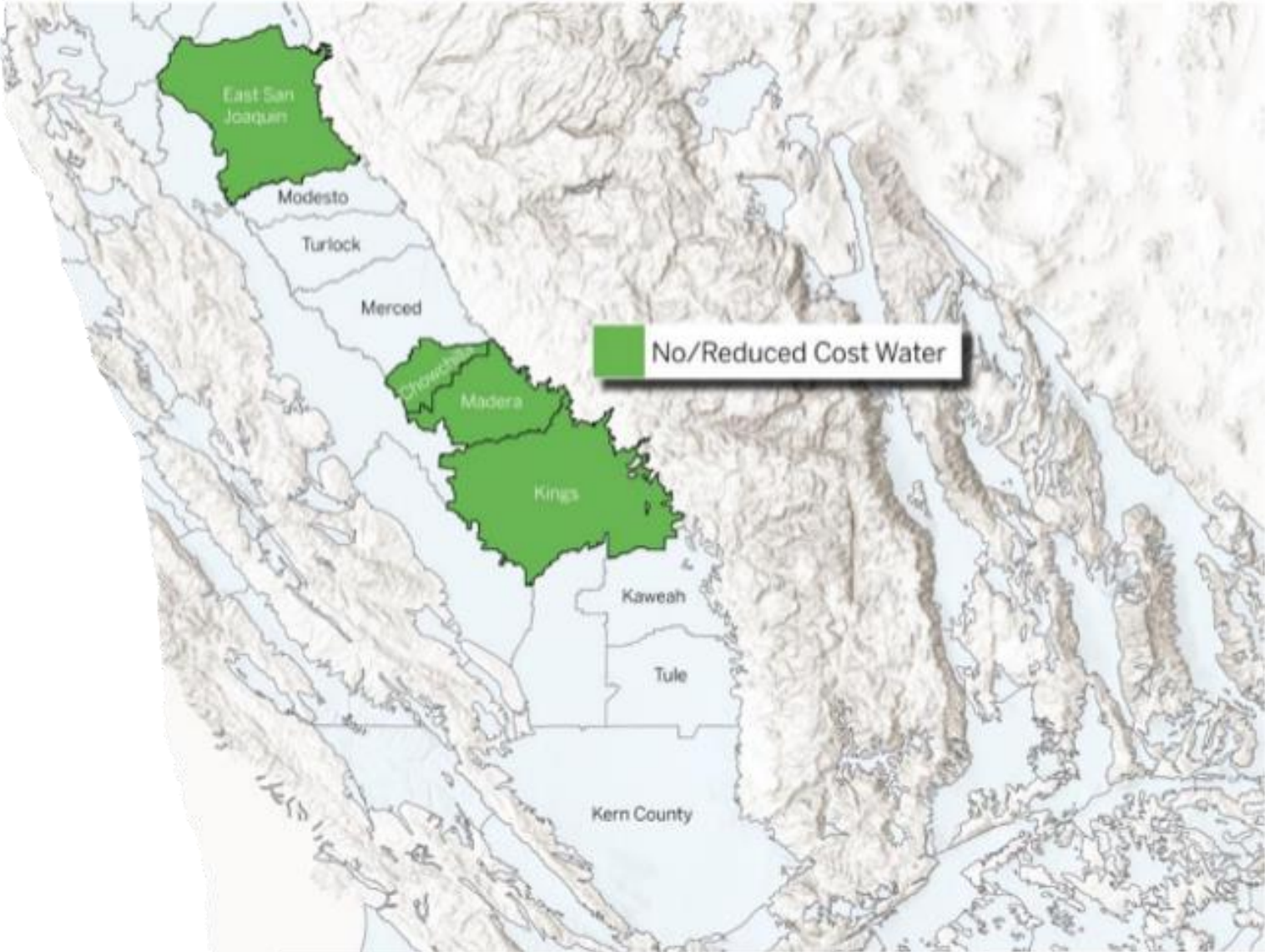
Incentives for landowners are still developing, and pumping credits are currently the most widespread

% of respondents

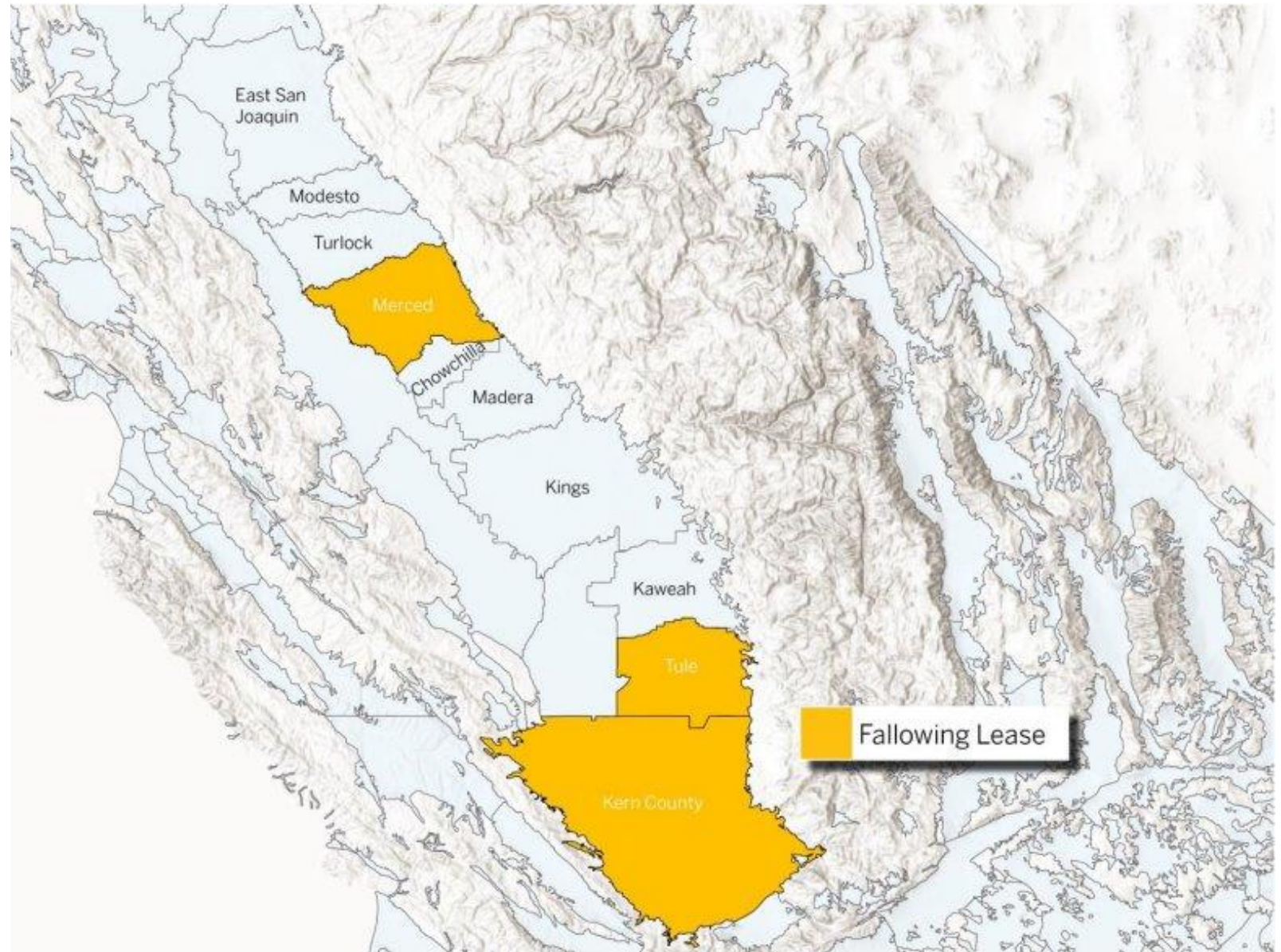


Source: Public Policy Institute of California, Water Policy Center, "Replenishing Groundwater in the San Joaquin Valley: 2024 Update"

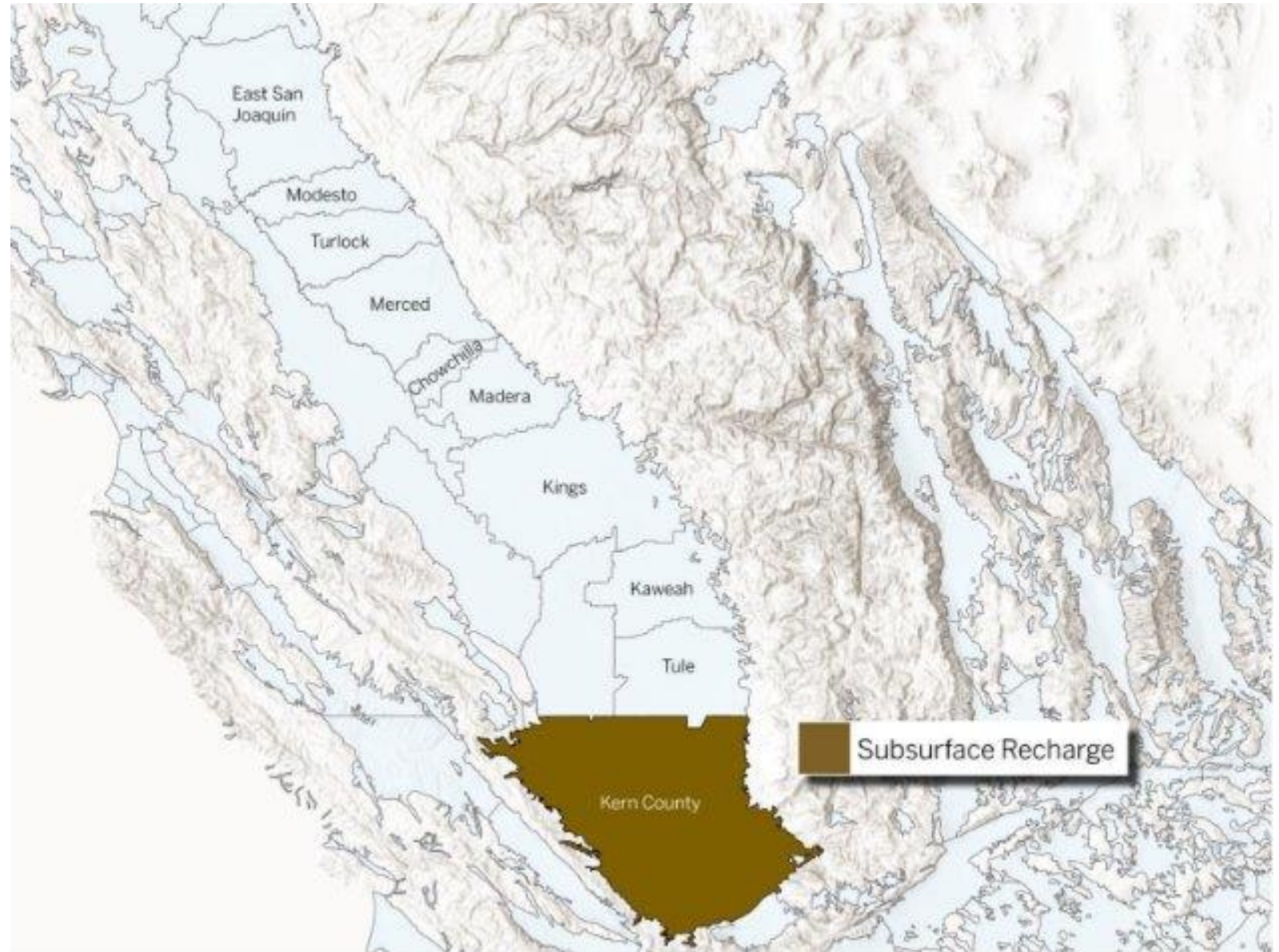
# Reduced Cost for Recharge Water



# Following Leases for GW Demand Reduction



# Subsurface Recharge Cost Share Programs





# Groundwater Pumping Credits



# Education and Technical Assistance

The cover of the 'On-farm Recharge Pilot Projects Case Study' report features the Sustainable Conservation logo and the California Department of Water Resources seal. The title is 'On-farm Recharge Pilot Projects Case Study'. Below this, a green banner contains the grower information: 'Grower: Christine and Erich Gemperle', 'Crop: Almonds', and 'Location: Ceres, Stanislaus County', accompanied by an image of almonds. The section 'Site Conditions' includes two photographs: one showing a dirt path in an orchard and another showing a flooded field. A bulleted list of site details is provided at the bottom.

**Sustainable Conservation**  **On-farm Recharge Pilot Projects Case Study**

**Grower:** Christine and Erich Gemperle  
**Crop:** Almonds  
**Location:** Ceres, Stanislaus County

**Site Conditions**


- Acreage = 36.5 acres for recharge in a 40-acre field
- Crop type = Almonds
- 20 acres, crop age = 5 years
- 20 acres, crop age = 21 years
- Land IQ rating = Moderately good
- Soil Agricultural Groundwater Banking Index rating = Excellent

1

The cover of the 'On-Farm Recharge Methods Manual' report has a blue background. The title 'ON-FARM RECHARGE METHODS MANUAL' is in large white letters, with the subtitle 'A summary of strategies and challenges' below it. The 'Prepared By' and 'Funded By' information is on the right. The central part of the cover features three photographs: a long, narrow canal in an orchard, a dirt path in a field, and a flooded orchard. The bottom of the cover includes the California Department of Water Resources seal and the Sustainable Conservation logo.

**ON-FARM RECHARGE METHODS MANUAL**  
*A summary of strategies and challenges*

**Prepared By:** Sustainable Conservation  
**Funded By:** California Department of Water Resources  
August 2023



**Sustainable Conservation**

Sustainable Conservation and partner recharge guidance

# On-Farm Recharge Examples

Dormancy



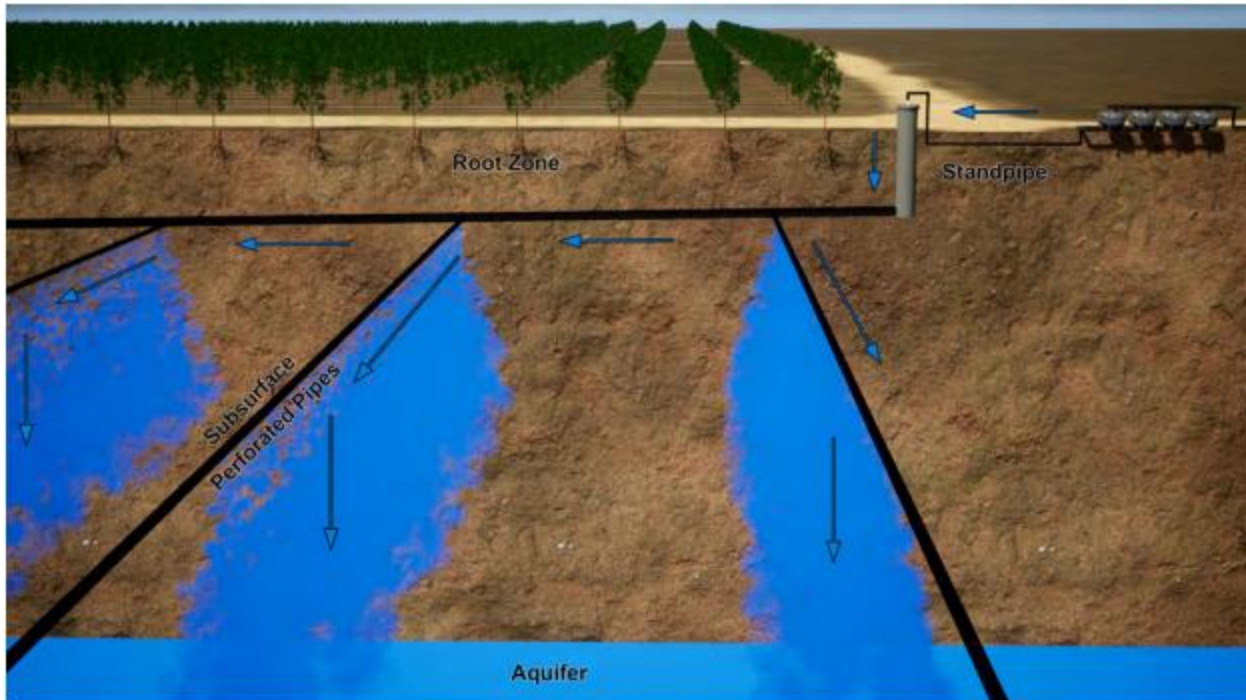
Growing season recharge & surface water for irrigation/in-leu recharge



# On-Farm Recharge: **Conservative Applications**



# Alternative On-Farm Recharge Examples



Source: Lidco, Inc.

## Subterranean Recharge

- Reverse tile drain

## Dedicated Micro-Basins

- Existing and newly constructed basins
- Multipurpose:
  - Surface runoff
  - Sediment control
  - Recharge

# Water Application: **Infrastructure Flexibility**



Dual Flood and Micro  
Irrigation Systems



Filtered & Pressurized Surface and  
Groundwater (In-lieu recharge)



# Field Preparation: **Temporary Infrastructure**

# Multibenefit Recharge

## Examples:

- Drinking Water Resiliency
- Habitat: Floodplains, Upland Habitat , GDEs
- Strategically located recharge

## Funding Sources:

- MLRP
- Corporate Funding
- USDA NRCS
- Land Flex



A recent change in California law is expected to result in significantly more public funding for groundwater recharge like this state-run project, which diverted floodwater from the San Joaquin River to a Madera County ranch in winter 2023. Photo: California Department of Water Resources



**Thank you!**



Joe Choperena, Project Director Water Resources

[jchoperena@suscon.org](mailto:jchoperena@suscon.org)

Technical Resources:

<https://suscon.org/technical-resources/>



Recharge resources



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## What to Do with Unplanted Land?

**Speaker:** Bret Sill (Almond Grower)





# What can I do with your Lands?

Bret Sill 12-10-2024



# Crop Rotations

## Contract to grow

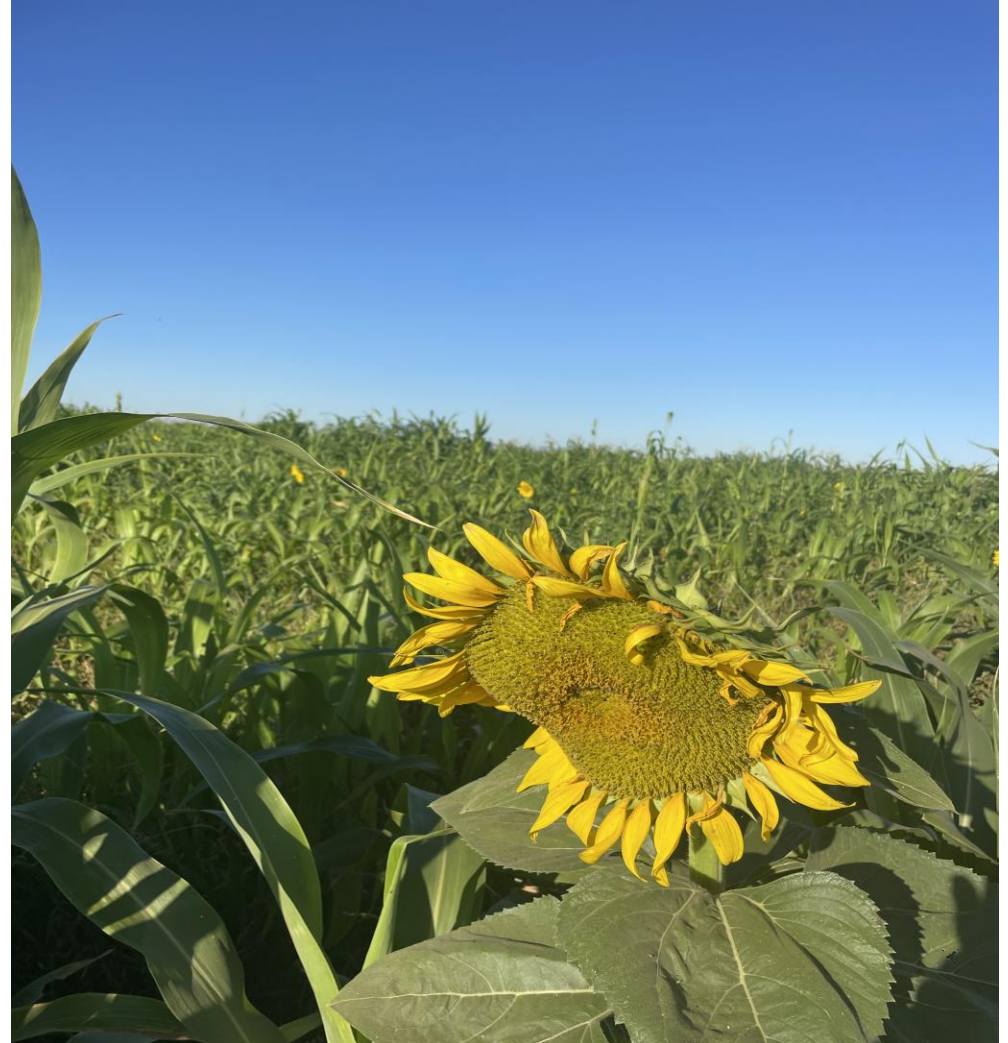
- Carrots
- Garlic
- Potatoes
- Tomatoes
- Onions



# Planting Cover Crops

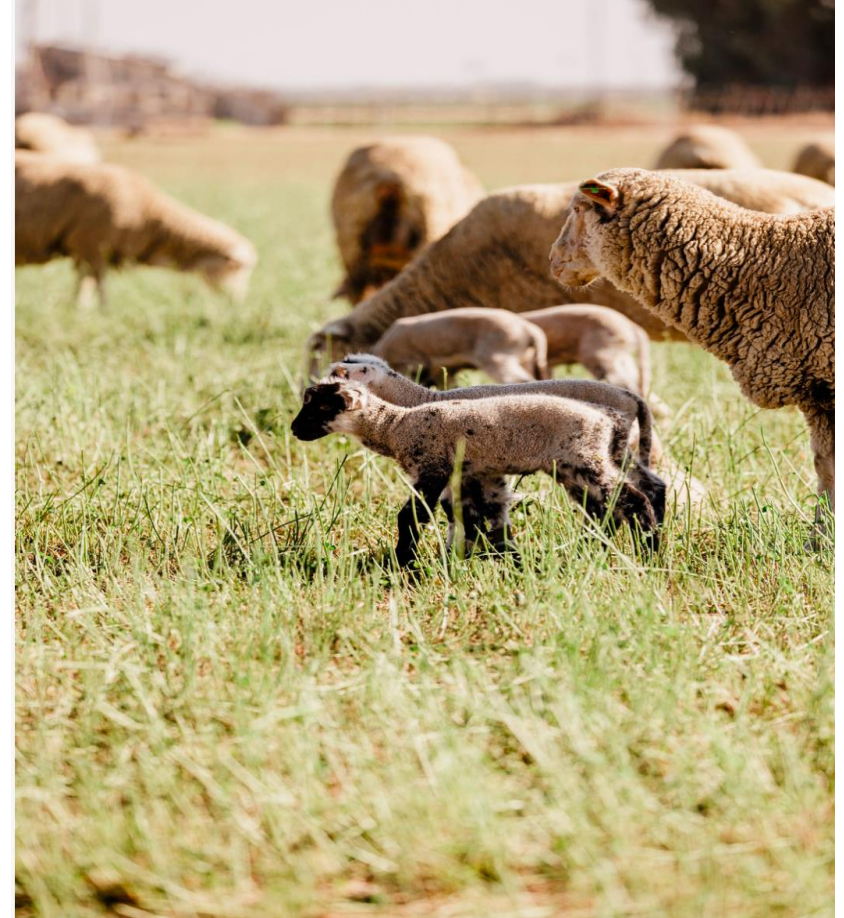
## Why plant Cover Crops?

- Building organic material
- Improve Carbon
- Give ground rest
- Improve soil health
- Know when to terminate



# What to do once an orchard is removed?

- Reincorporate wood chips
- Plant Cover crops
- Rotate to cash crop
  - Add some Nitrogen to help breakdown wood
  - Graze Covers with sheep cycle nutrients
  - Build soil health
  - Seek Carbon program for credits



# Work with Irrigation District & GSA



- Does ID have a following program?
- Save water and apply to another Almond orchard
- Recharge fallow lands



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ROOTED TOGETHER  
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## What to Do with Unplanted Land?

**Moderator:** Michael Roots (ABC)



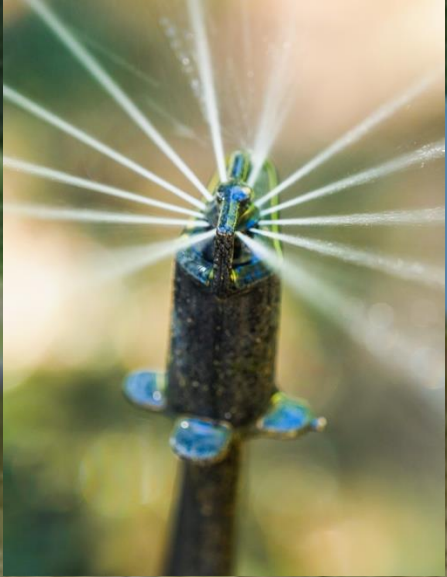




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Please complete a brief  
survey regarding  
groundwater recharge

Your thoughts and  
comments help us to  
continually improve





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THANK YOU

ALMOND BOARD OF CALIFORNIA