

Water and the Future of the San Joaquin Valley

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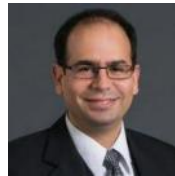
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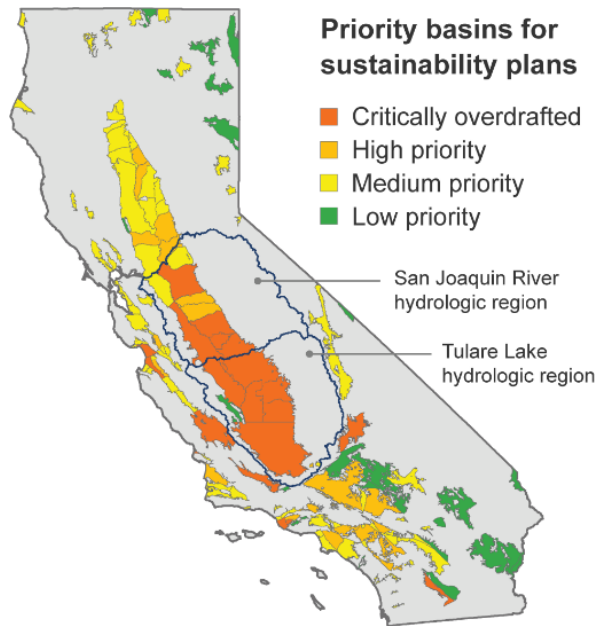


The San Joaquin Valley is at a pivotal moment

- California's largest farming region faces unprecedented challenges and inevitable change
- Much at stake for region's economy, public health, environment
- Most promising approaches
 - Increase flexibility
 - Provide incentives
 - Leverage multiple benefits
- Increased cooperation, coordination will be key
- State, federal governments can provide vital assistance



The valley is ground zero for implementing the Sustainable Groundwater Management Act (SGMA)

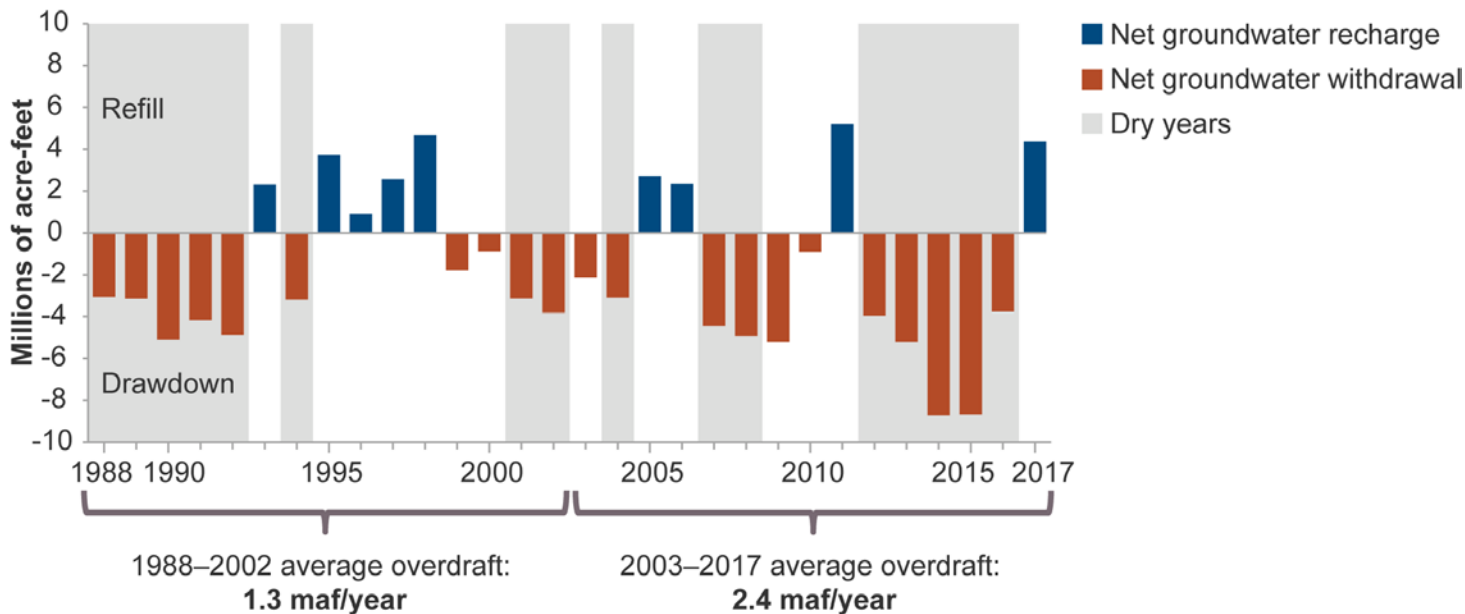


- Most of the valley's groundwater basins are critically overdrafted; average deficit ~2 million acre-feet/yr
- Consequences are dry wells, sinking lands, reduced supplies for droughts
- Most basins must adopt plans by 2020, achieve sustainability by 2040
- Attaining balance means more recharge, less water use, or both



Groundwater withdrawals exceed recharge in all but the wettest years

- 30-year valley-wide deficit (1988-2017): 1.8 maf/year



Groundwater quality must be addressed while implementing SGMA

- Three new areas of focus
 - Providing safe drinking water
 - Managing nitrogen loading
 - Managing salt balance
- Potential synergies, but also trade-offs, in tackling these issues alongside basin balancing



CV-SALTS meeting

Source: cvsalinity.org



Changes to water and land present new challenges, opportunities for stewardship

- Ecosystems under stress
- Water becoming scarcer
- More land available, but with less revenue
- Threats of land retirement: dust, pests, weeds
- Potential for multi-benefit approaches: healthy soils, habitat, solar, recharge, flood protection, recreation

Rivers



Wetlands



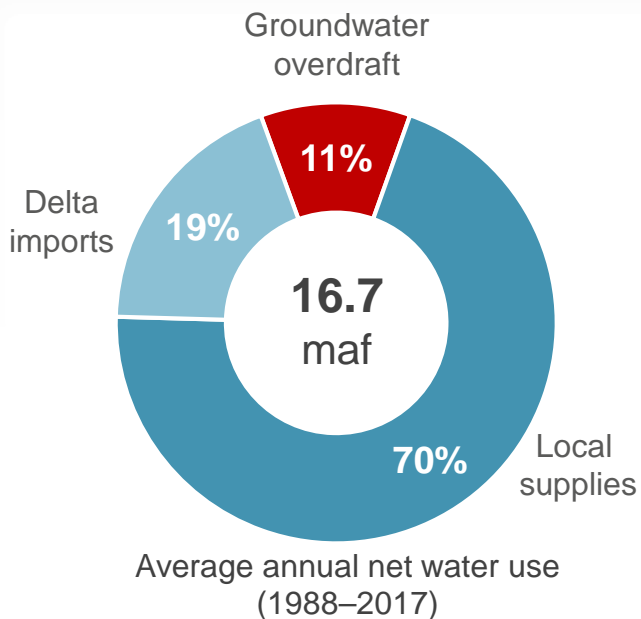
Drylands



Four priority areas for action

- Balancing water supplies and demands
- Ensuring safe and reliable drinking water
- Managing groundwater quality for the long-term
- Fostering beneficial water and land use transitions

Many approaches to reduce overdraft



Supply management options

- Capture and store more local runoff
- Increase local runoff (headwaters management)
- Increase Delta imports
- Reduce exports to other regions
- Reuse and repurpose local supplies

Demand management options

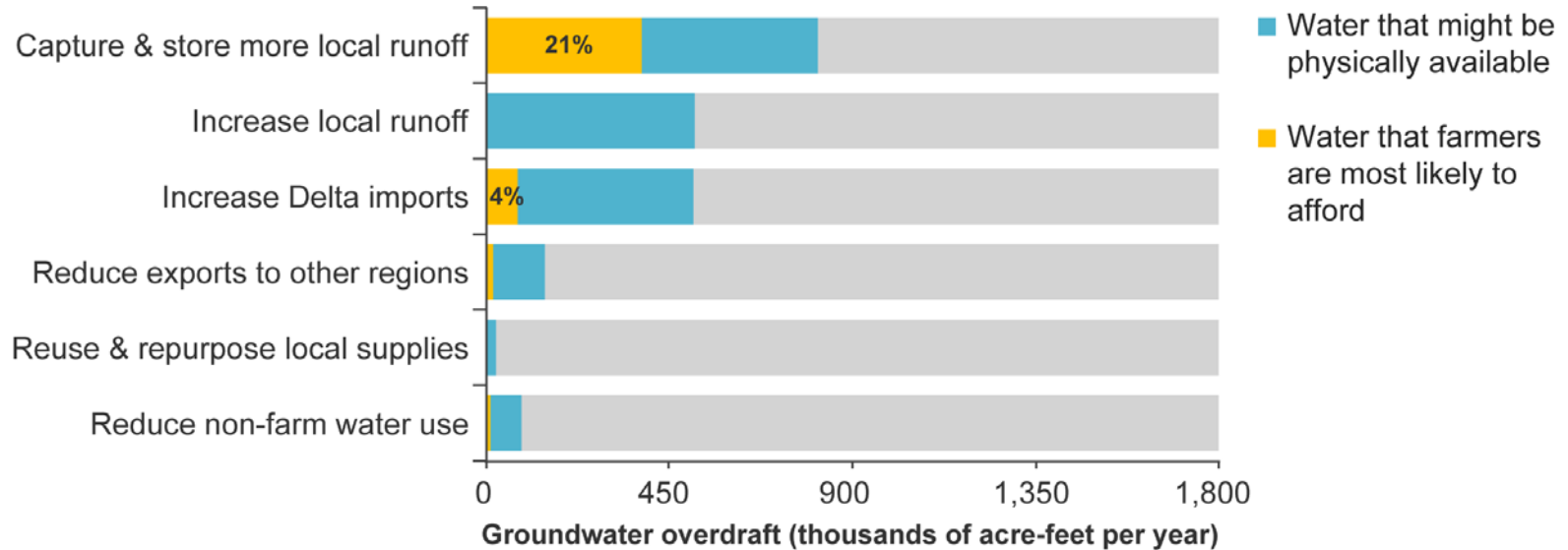
- Reduce net farm water use
- Reduce net urban water use
- Reduce net water use for open space, wetlands
- Reduce losses from water infrastructure
- Increase flexibility

We examined approaches shown in red



Supply options vary greatly in potential yield and in affordability for valley farming

New supplies can affordably fill about 25% of overdraft

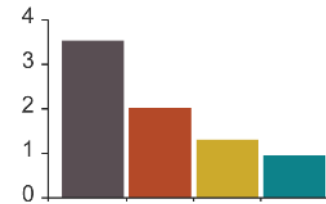


Flexibility is key to managing farm water demand

- Inflexible water use is most costly
- Local water trading slashes costs
- Valley-wide surface water trading cuts costs further
- Trading + new supplies also reduces land fallowing

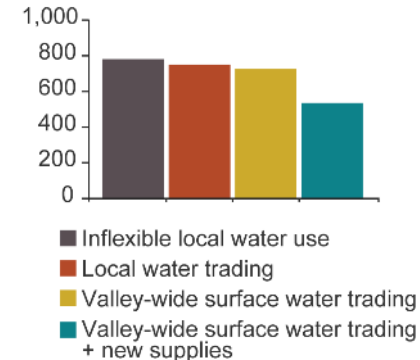
Crop revenue losses

(billions of \$)



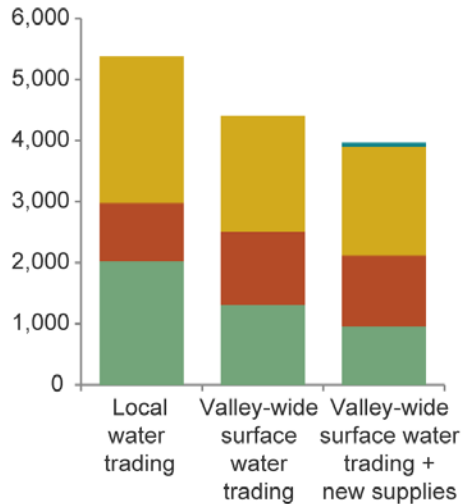
Land fallowing

(thousands of acres)

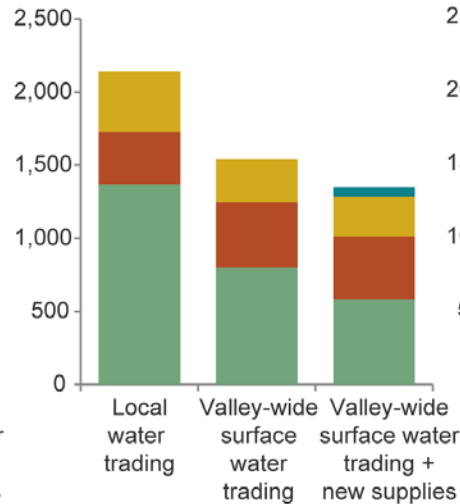


A portfolio approach can minimize regional economic losses

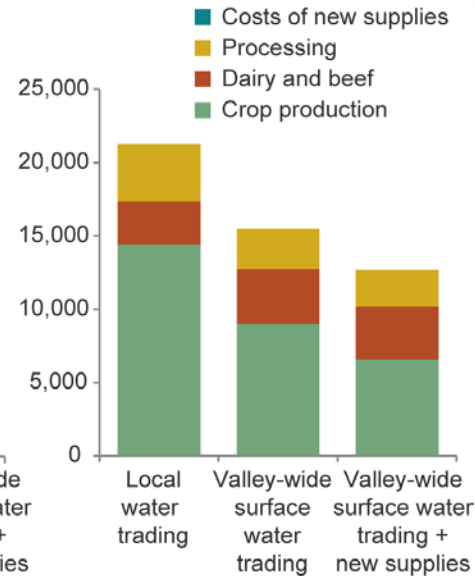
A) Revenue losses
(\$ millions)



B) GDP losses
(\$ millions)



C) Job losses



- Gradually ending overdraft (“glide path”) can also help



Priorities for bringing supplies and demands into balance

1. *Assess infrastructure needs, modernize operations
2. Incentivize recharge on farmland
3. Develop local water trading rules
4. *Clarify how much water is available for recharge
5. *Facilitate approvals for trading and banking projects
6. Coordinate to maximize benefits

** Priority areas for state and federal involvement*

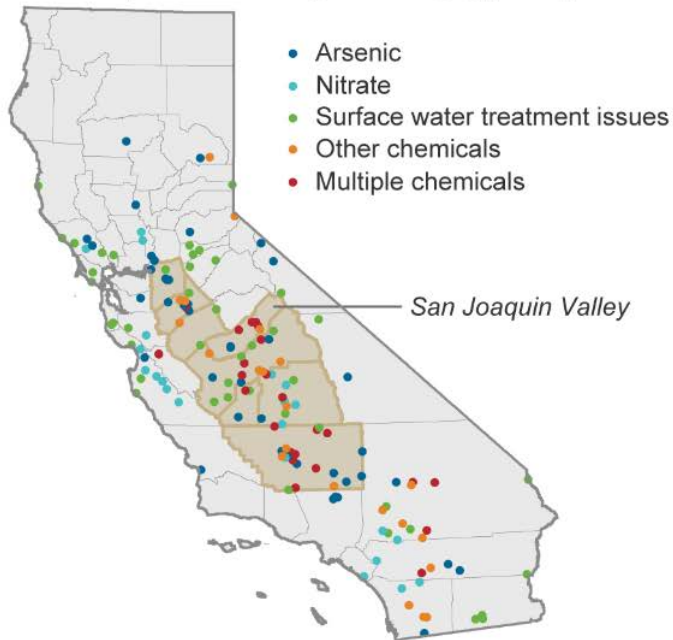


Four priority areas for action

- Balancing water supplies and demands
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- Managing groundwater quality for the long-term
- Fostering beneficial water and land use transitions

The valley is a hot spot for California's safe drinking water crisis

A) Non-compliant water systems by type of pollutant



B) Water systems and households facing shortages



Priorities for ensuring safe and reliable drinking water

1. *Consolidate, aggregate systems
2. *Provide technical support
3. *Plan for shortages and mitigate dry wells
4. *Ensure funding

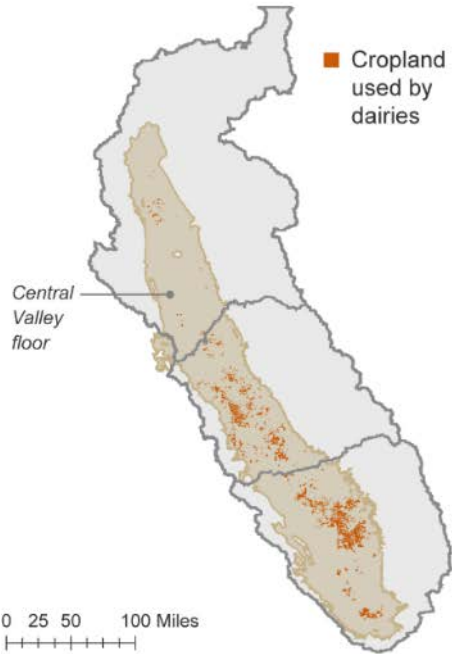
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Four priority areas for action

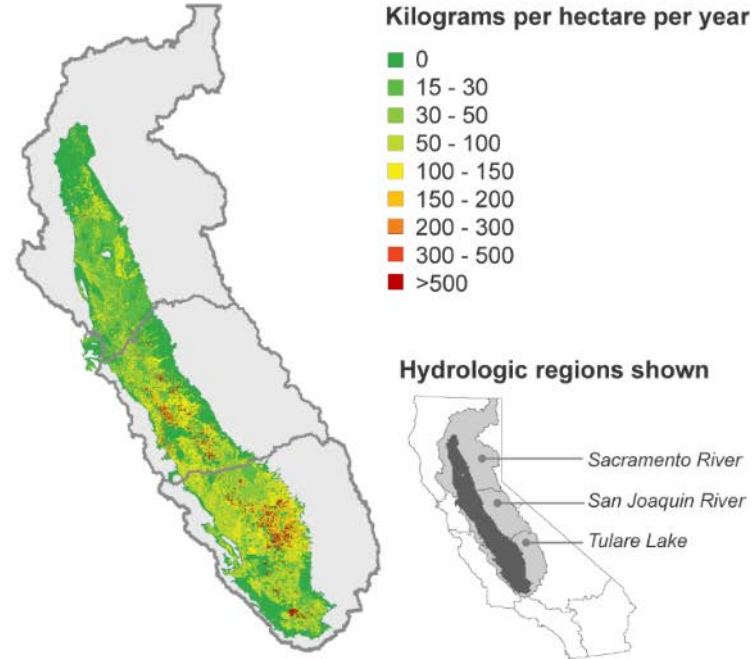
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Most farming adds nitrate to groundwater; dairies face special challenges in managing manure

A) Cropland used by dairies

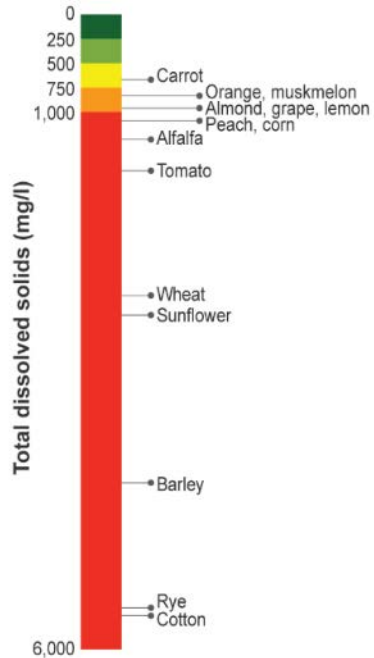


B) Nitrogen loading to groundwater



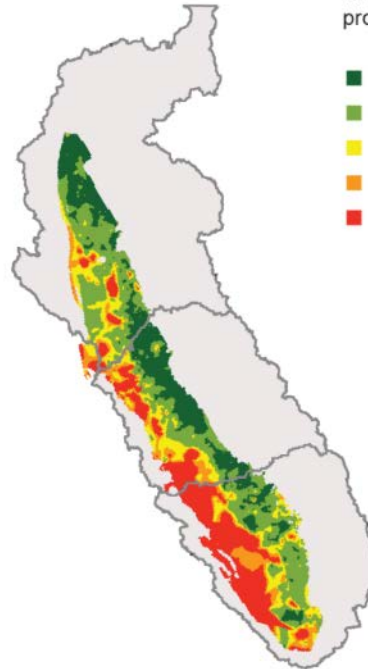
Salt build-up is reducing crop productivity

A) Salinity thresholds at which crop yields start to decline



B) Shallow groundwater salinity

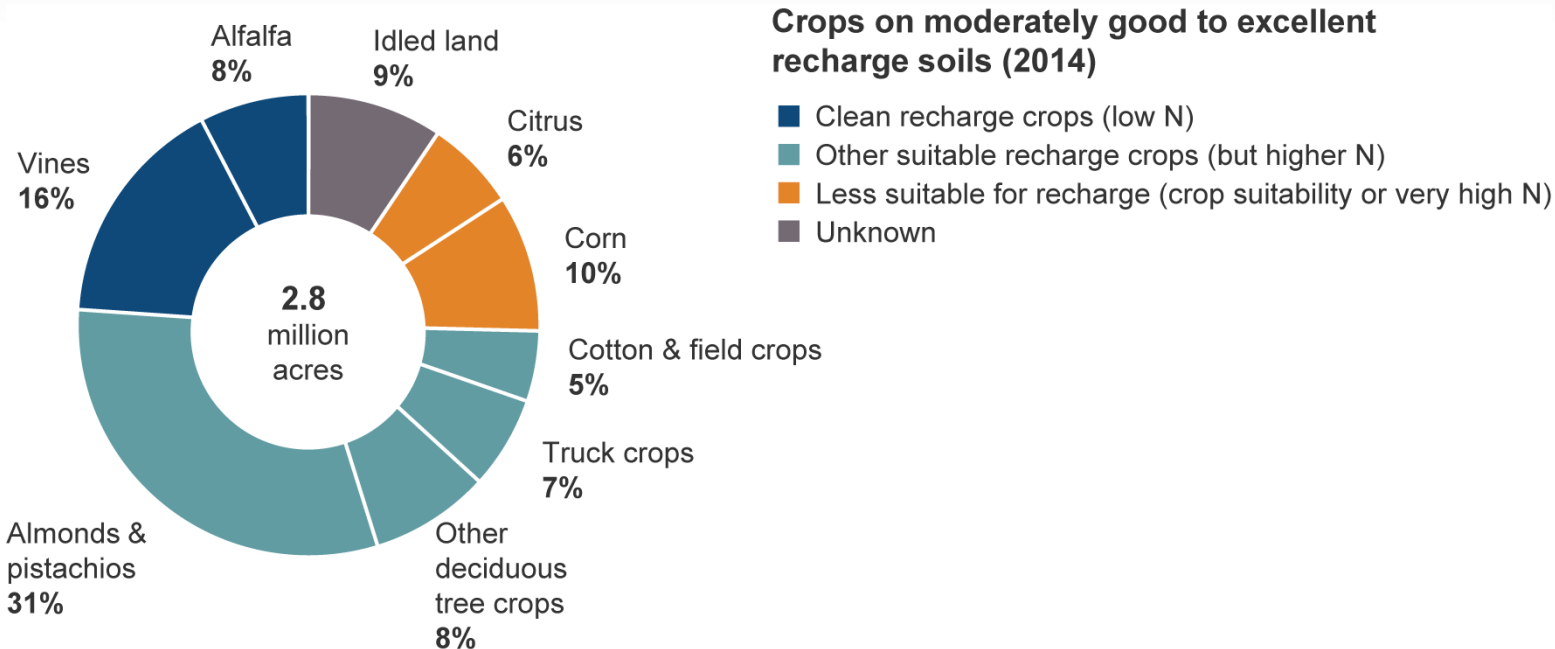
Total dissolved solids in the production zone (mg/L)



Hydrologic regions shown



Tools to balance groundwater supplies and demands can affect groundwater quality



Priorities for managing groundwater quality

1. Coordinate water quality and quantity management
2. Implement new technologies to manage pollutants, especially for dairies
3. *Provide regulatory flexibility to manage nitrogen, salt loading

** Priority areas for state and federal involvement*

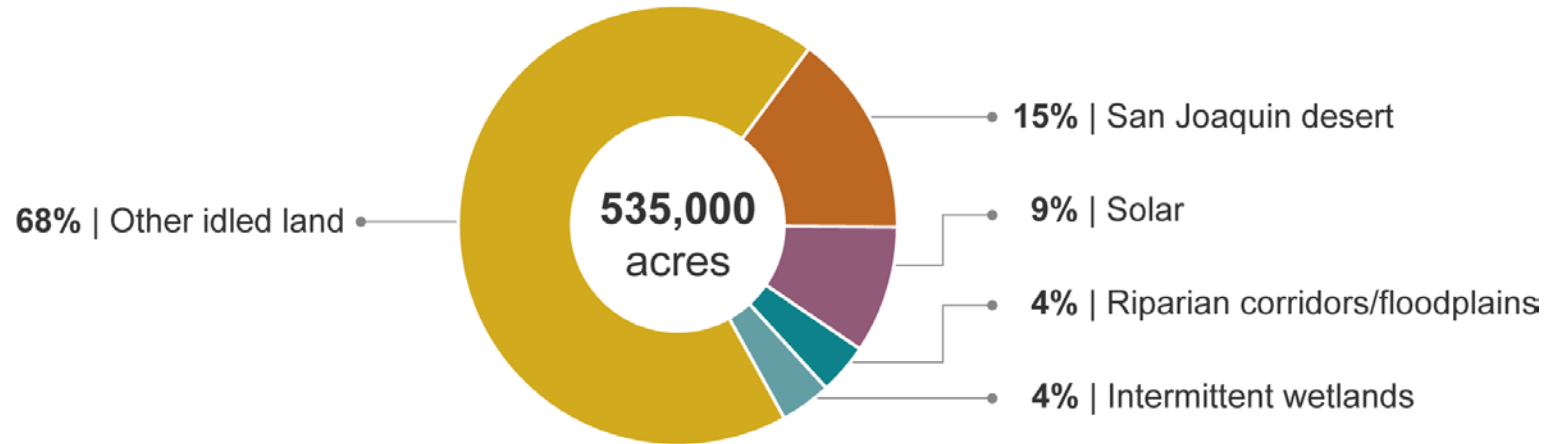
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Current planning efforts only account for 1/3 of land likely to be fallowed

- The goal should be to steward all idled lands

Potential uses of formerly irrigated lands



Priorities for fostering beneficial water and land use transitions

1. Initiate broad-based, inclusive planning
2. *Implement flexible regulatory approaches
3. *Provide financial incentives
4. *Boost technical support, R&D

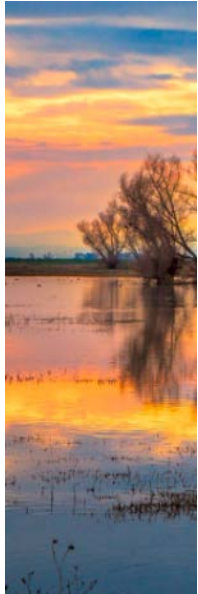
** Priority areas for state and federal involvement*

How can the state be most helpful now?

- Ensure a robust, comprehensive framework for safe drinking water solutions
 - Financial, technical, managerial
- Support the region's transition to groundwater sustainability
 - Regulatory clarity, consistency, flexibility
 - Assessment of smart infrastructure investments
 - Pilot efforts for innovative approaches on the ground
 - Technical support, R&D
 - Broad-based planning, led by the region



Thank you



Notes on the use of these slides

These slides were created to accompany a presentation. They do not include full documentation of sources, data samples, methods, and interpretations. To avoid misinterpretations, please contact:

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Thank you for your interest in this work.

