Water Stress and a Changing San Joaquin Valley

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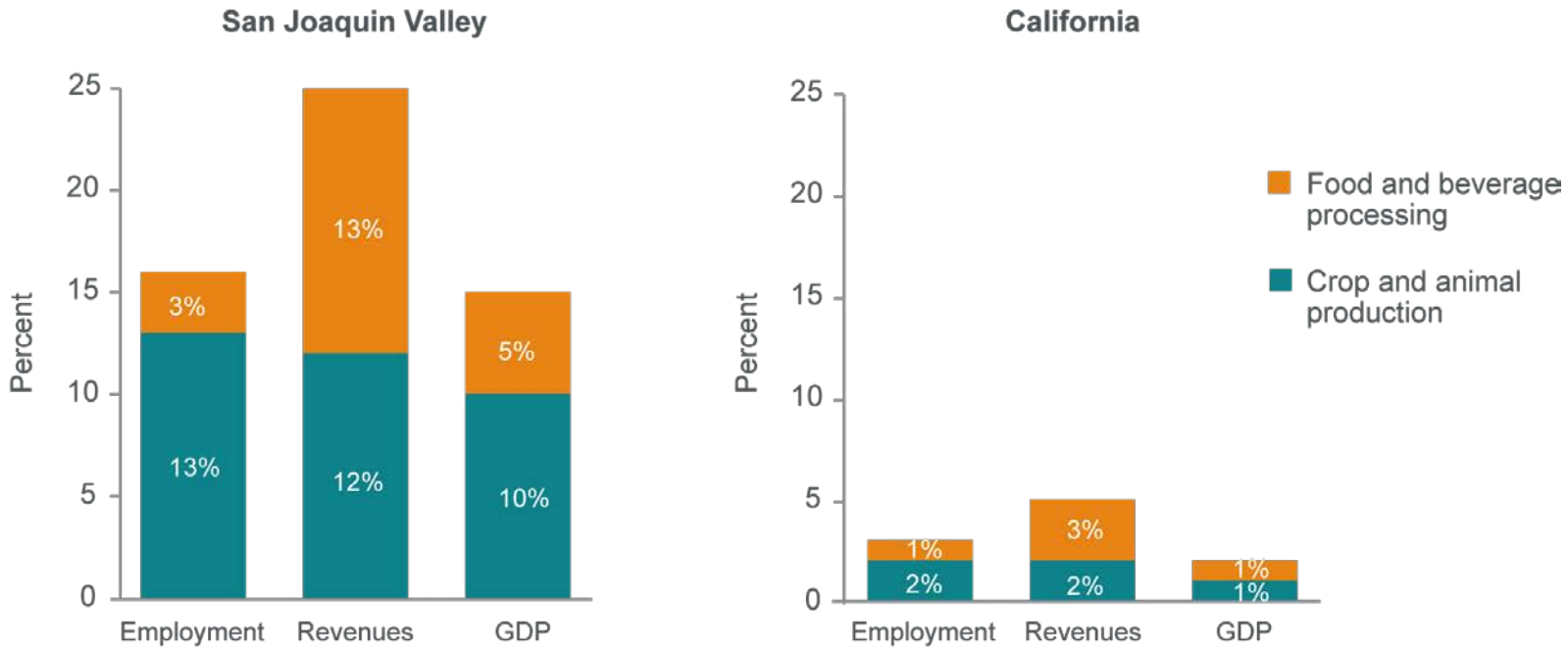
The San Joaquin Valley is at a pivotal moment

- 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

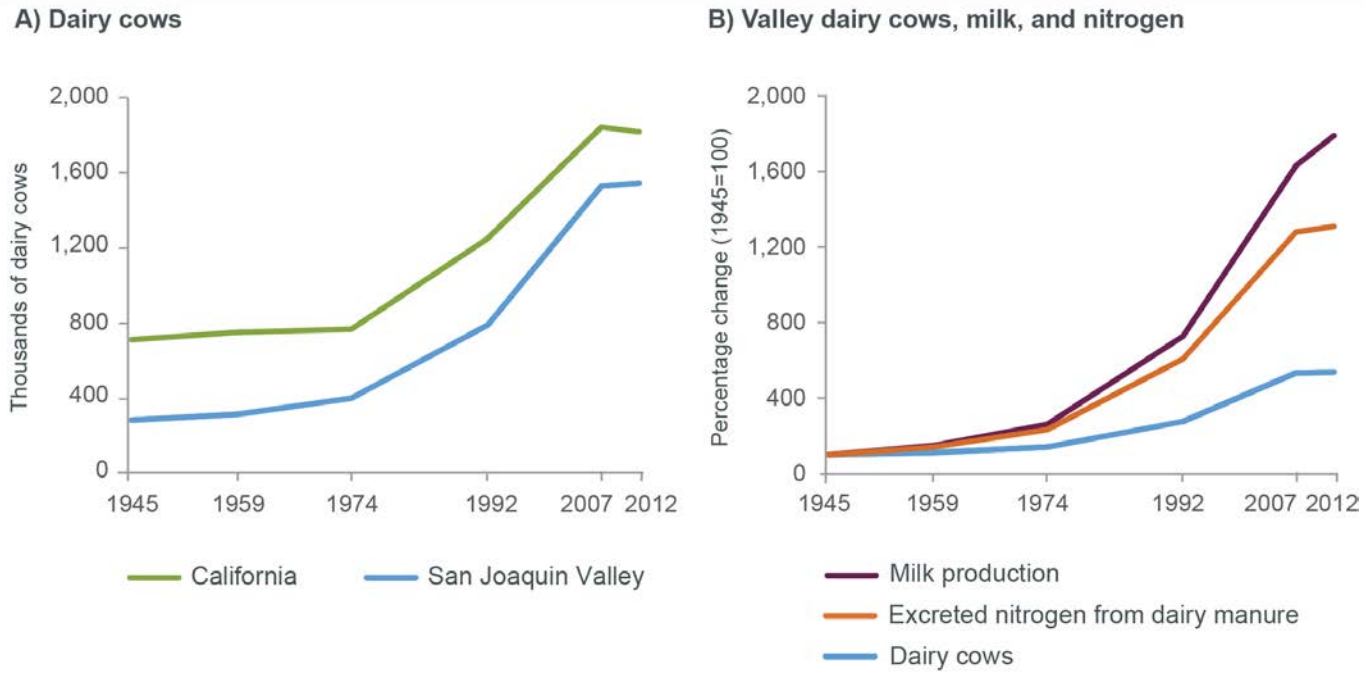
Outline

- Agriculture and the valley's economy
- The valley's long-term water imbalance
- Strategies, tools, and cooperative approaches

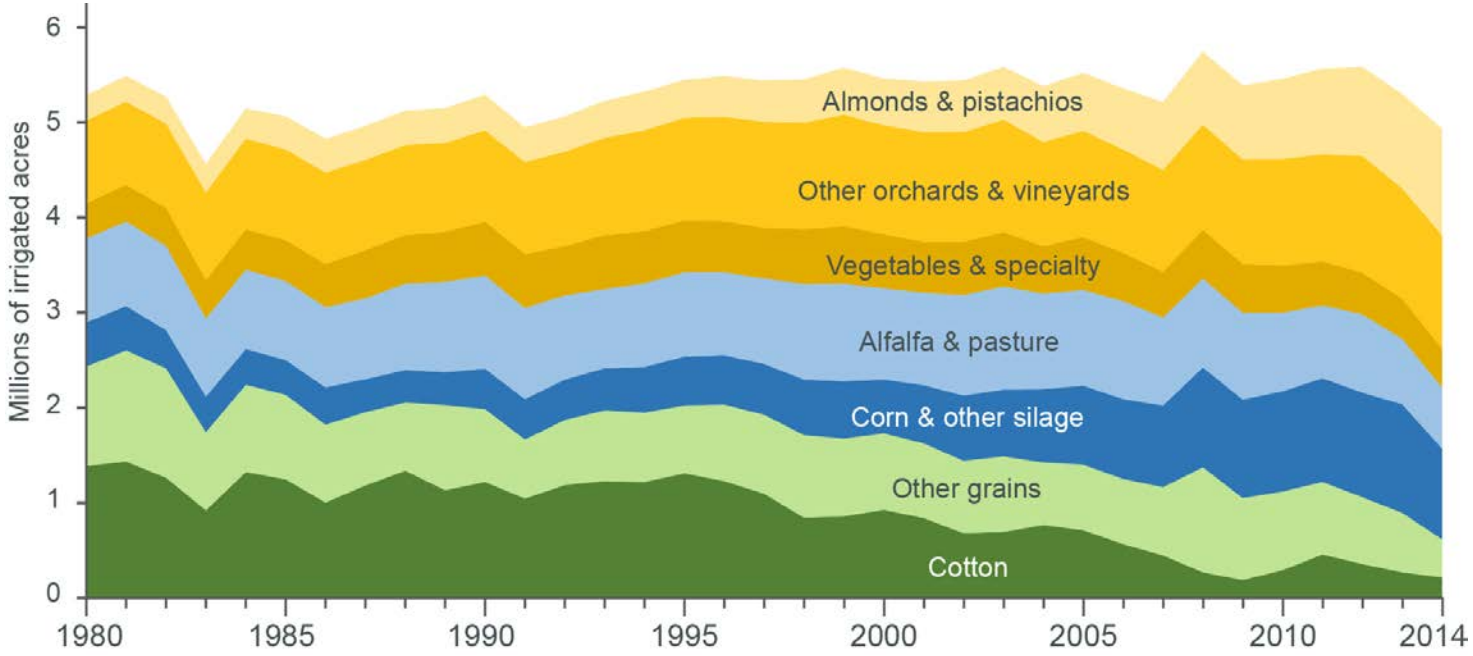
Valley agriculture is a local economic driver



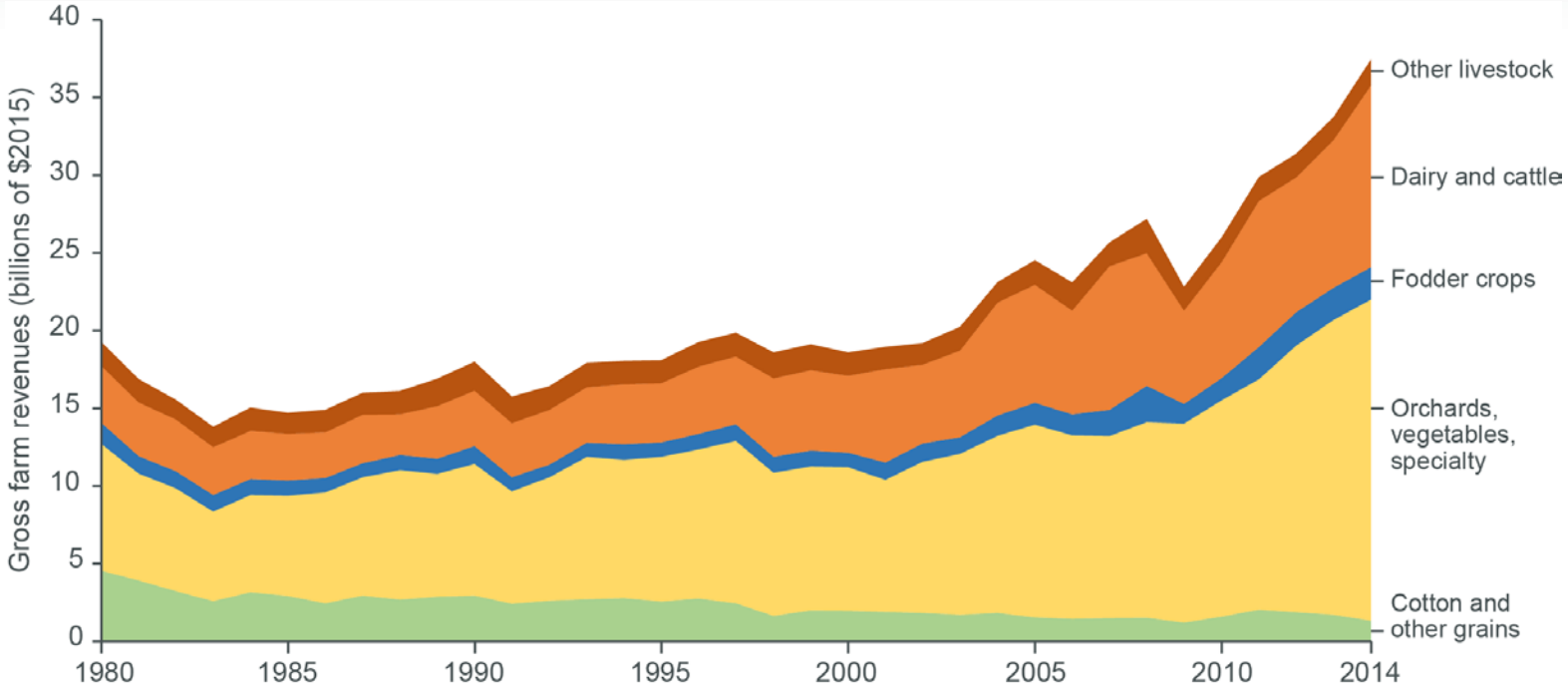
The valley is California's main dairy region



Agriculture adapts to changes in markets, technology, and water availability



Changes have spurred real revenue growth



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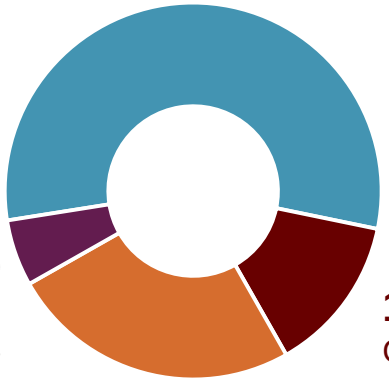
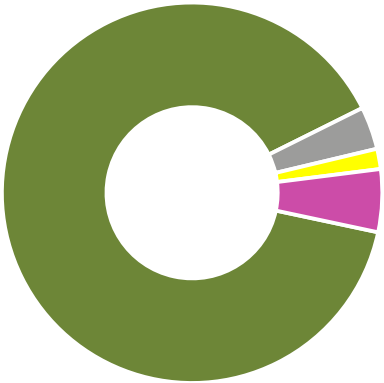
The valley faces a long-term water imbalance, with reliance on groundwater overdraft

Annual averages 1986-2015

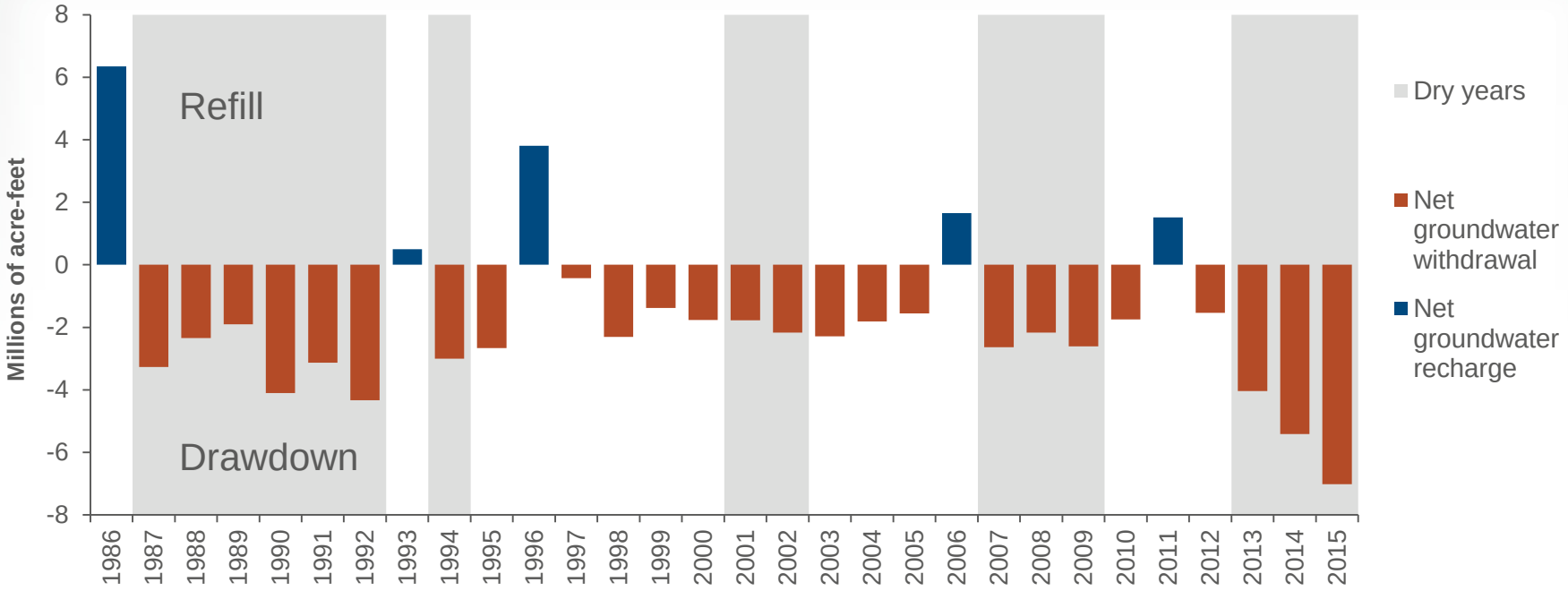
Net Water Sources
13.3 MAF



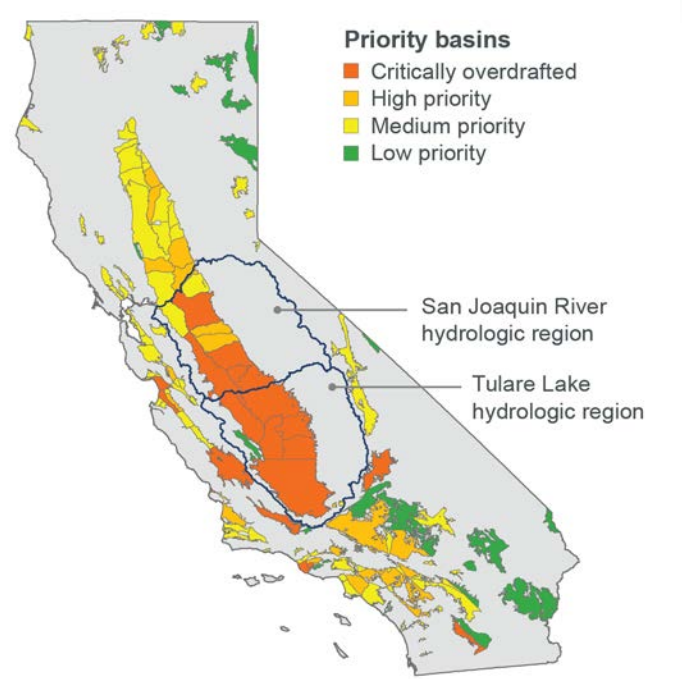
Net Water Uses
13.3 MAF



Drought and declining imports have accelerated groundwater overdraft



State groundwater law requires balancing supply and demand



- Most of the valley's groundwater basins are critically overdrafted
- 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
- Impacts will vary across the region

Valley agriculture faces related water, air, and habitat quality challenges

- Nitrate in groundwater
  - Risks to drinking water
- Salinity in west-side soils and groundwater
  - Limits crop productivity
- Poor air quality
  - Could increase with more land fallowing under SGMA
  - Dairy industry will need to tackle methane emissions
- Highly altered natural environment
  - Conflicts over land, water management

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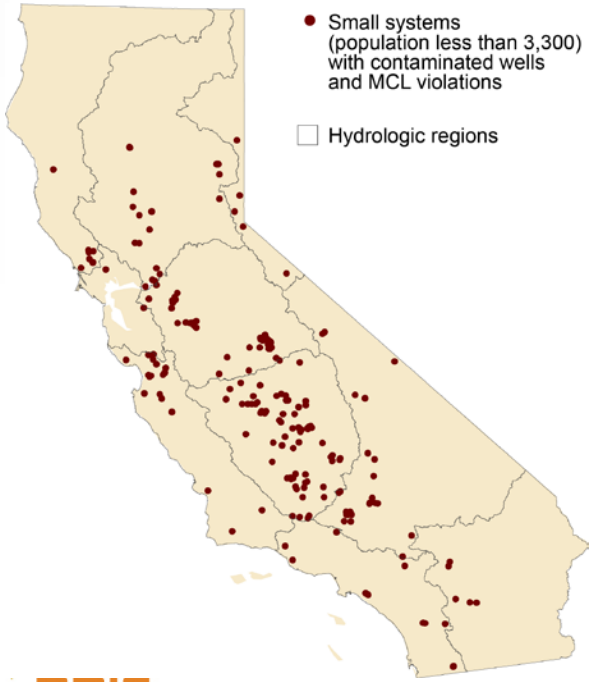
Many approaches to balance water supplies and demands

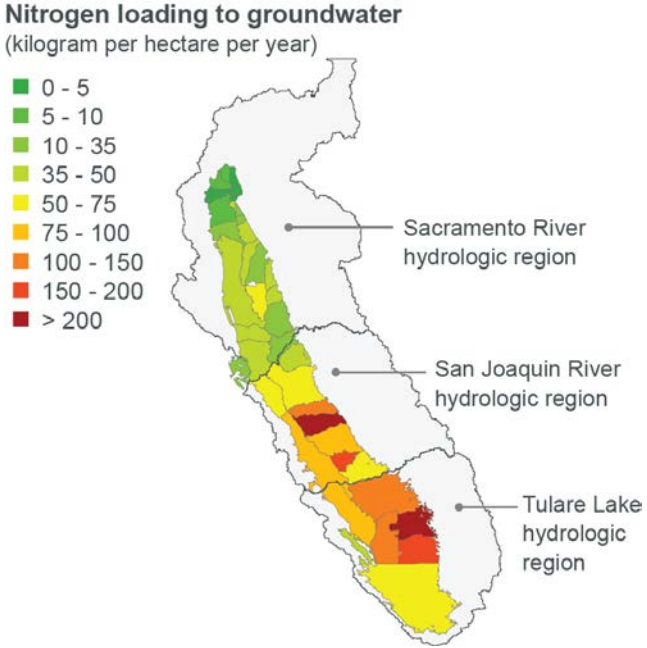
- **Manage groundwater reserves**
  - Water accounting
  - Incentive programs
- **Expand usable supplies**
  - Capture more local runoff
  - Repurpose local supplies
  - Improve Delta conveyance
  - Reduce coastal water demands
  - Change environmental flow standards
- **Reduce water demand**
  - Water trading
  - Flexible crops (e.g., alfalfa)
  - Rotational or permanent idling

Solutions for nitrate in groundwater

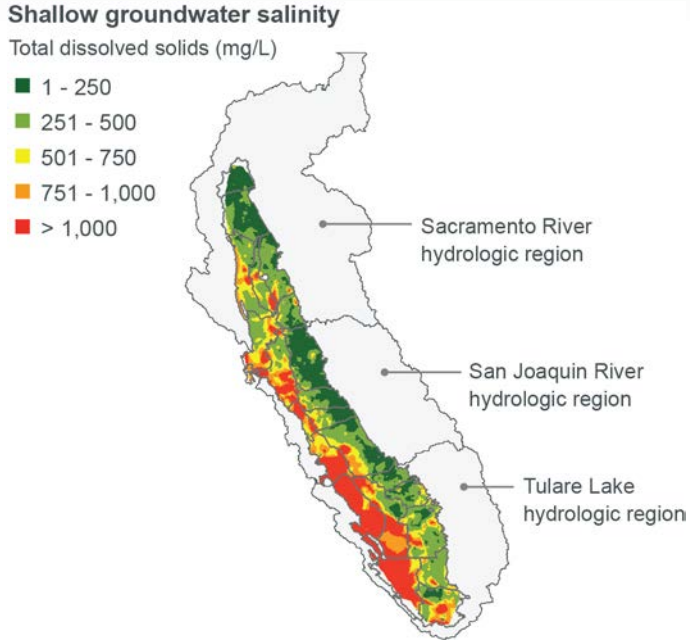
Safe drinking water programs



Farm programs to reduce nitrogen loading



Range of approaches for salinity, dust management



- Salts
  - Major infrastructure (desalinate, “brine line”)
  - Crop choices, irrigation management
- Dust from idled fields
  - Cover crops
  - Solar
  - Habitat

New approaches can reinvigorate the natural environment

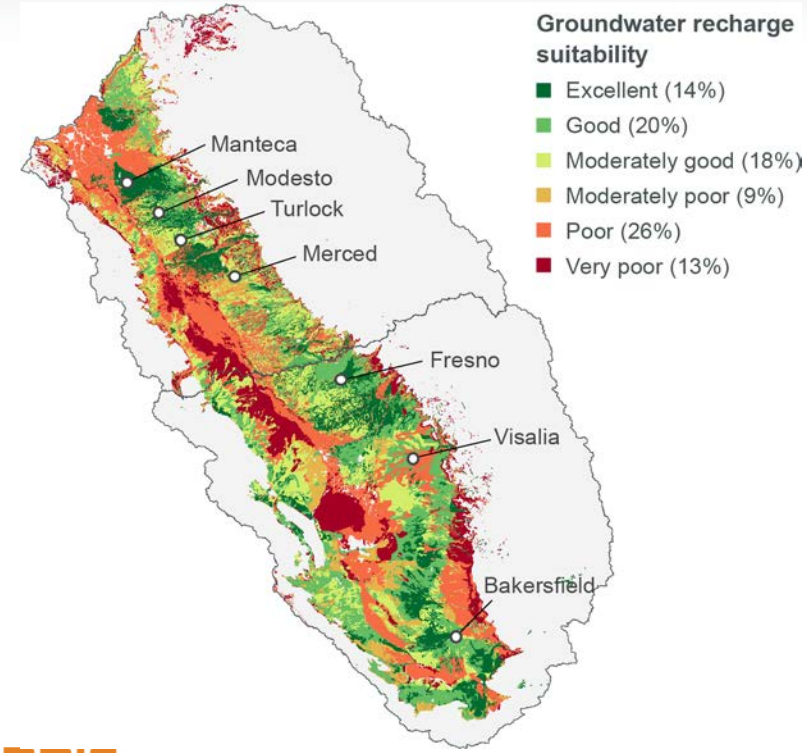
- Creative, realistic, “novel ecosystem” vision and goals
- Flexible habitat programs on working lands
- Voluntary settlement approaches for environmental flows

Rivers

Wetlands

Drylands

Manage recharge for water quality and quantity



- Tailoring irrigation systems, crop choices can
  - Maximize clean recharge in prime areas
  - Reduce chemical runoff elsewhere

Coordinate land idling with habitat needs

- Habitat connectivity on suitable lands
- Temporary habitat on rotationally fallowed lands
- Requires incentives, regulatory flexibility

Complex mix of local institutions manage water and land

- 70 local governments (62 cities, 8 counties)
- >150 irrigation water suppliers
- 671 drinking water suppliers:
  - 567 with <3,300 people
  - 400 with <300 people
- ~300(?) state small water systems
- ~1,300 non-community water systems (schools, etc.)
- ~70,000(?) domestic wells
- ~20,000 irrigated farms
- 215 resource-related districts
  - 65 land reclamation/levees
  - 25 flood control
  - 97 drainage
  - 27 resource conservation
  - 1 air pollution
- 17 IRWMs
- 15 SGMA sub-basins w/ 76 GSAs so far
- 12 irrigated lands coalitions
- 24 habitat conservation plans
- 3 safe-harbor agreements

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Effective and equitable solutions will require cooperative approaches

- Problems can’t be solved farm-by-farm
- Many opportunities to tackle multiple problems at once
- Urban-rural partnerships will be key
- State, federal agencies can play vital roles

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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For more information, see www.ppic.org/water

Thank you for your interest in this work.