

Bringing groundwater basins into balance: A status check on SGMA implementation

Southern California Water Dialogue

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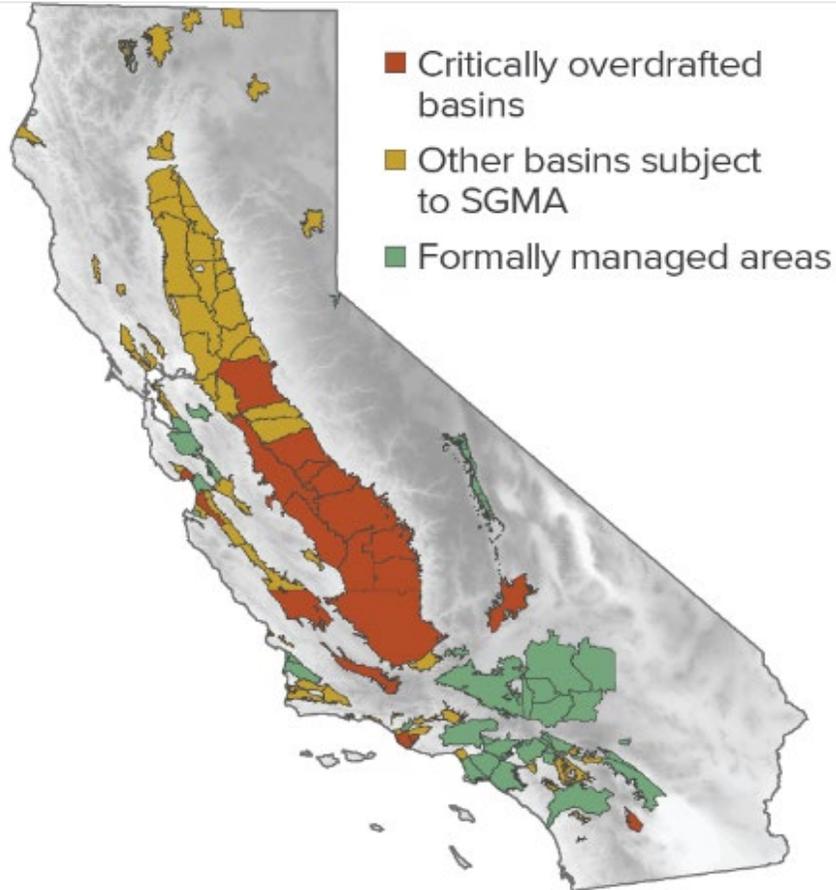
PPIC

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2014 Sustainable Groundwater Management Act (SGMA)

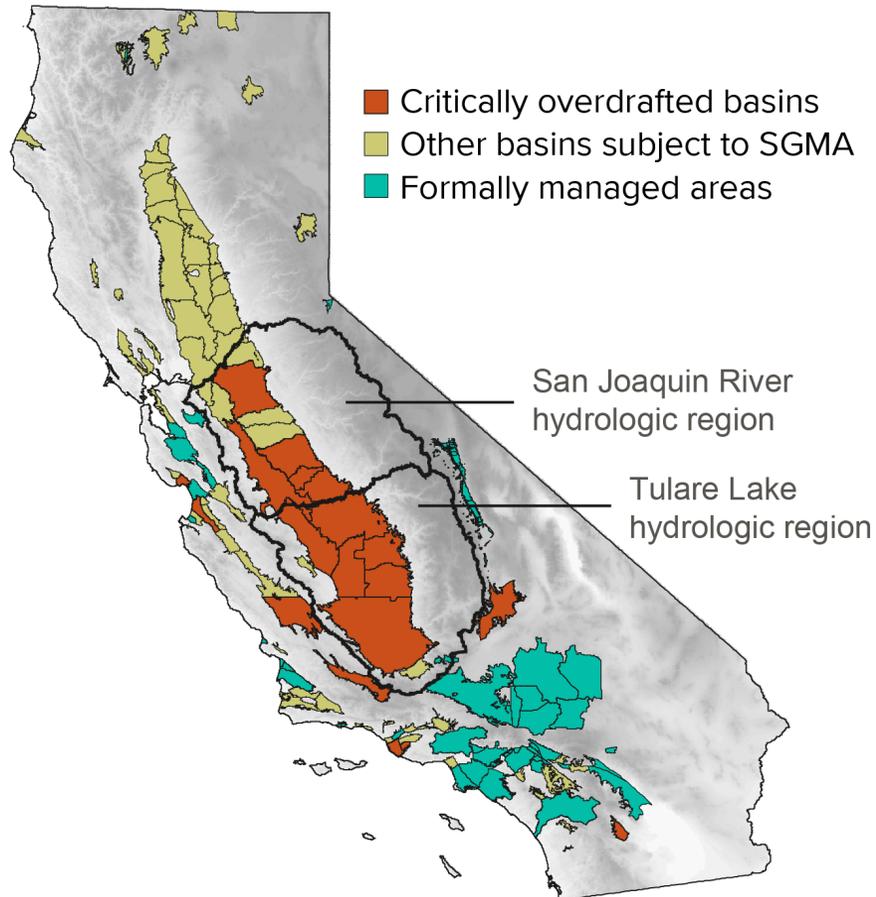
Main groundwater basins



- Local responsibility, state backstop
 - ~85 priority basins
 - > 250 sustainability agencies
- Sustainability plan deadlines: 2020/2022
 - Annual data reporting
 - Plan updates every 5 years
- Flexible timeline, with guardrails
 - 20 years to attain sustainability...
 - ...as long as no significantly unreasonable, undesirable effects

San Joaquin Valley is at ground zero for implementation

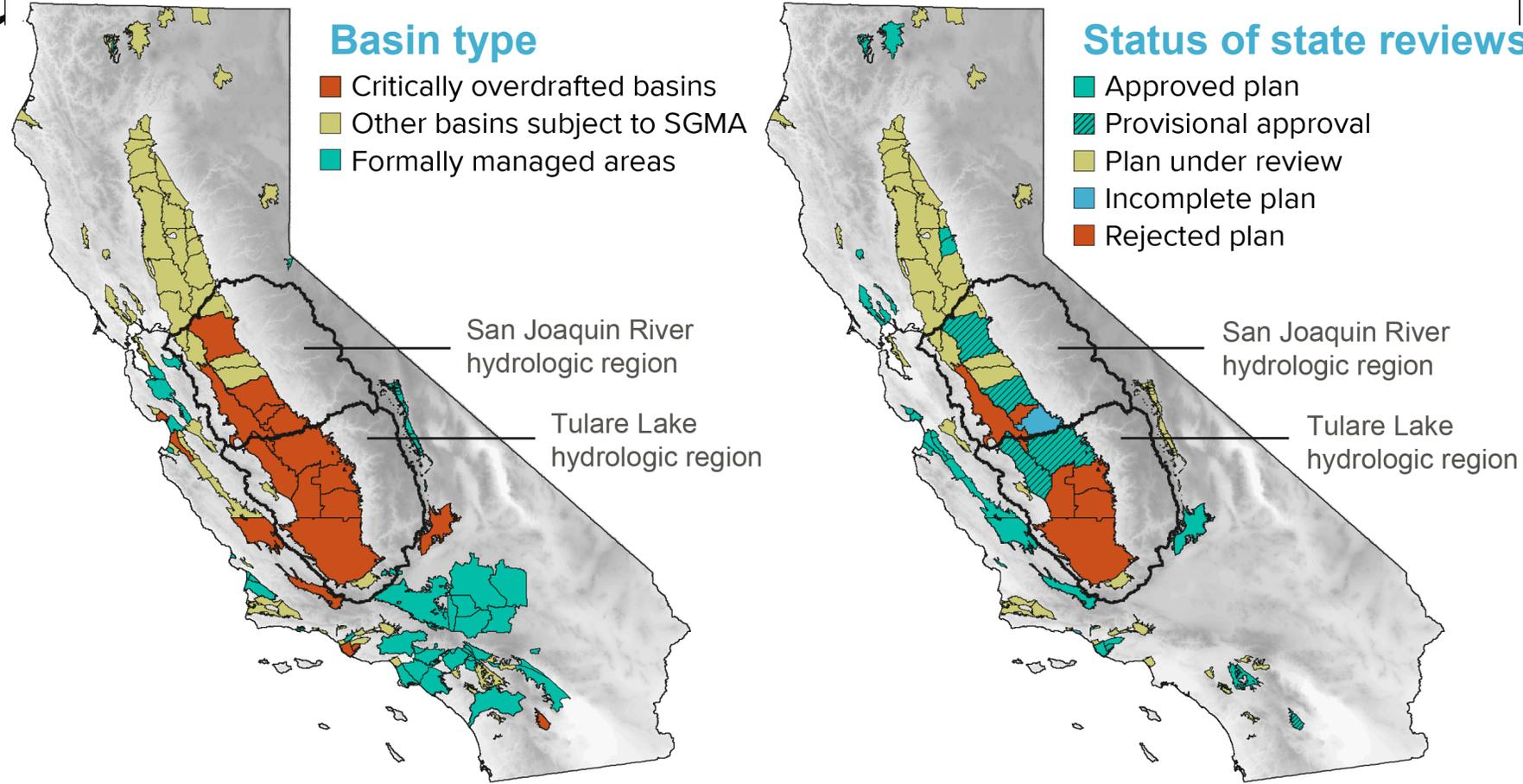
Main groundwater basins



- Largest ag region: >50% of CA output
- Biggest imbalance: ~2 M acre-feet/yr net overdraft
- Consequences: dry wells, sinking lands, reduced supplies for droughts
- Tightest timelines: most plans due in January 2020
- The groundwater math problem: attaining balance means more supply, less water use, or both
- The economics problem: some solutions are more costly than others

In general, CA basins have met early SGMA requirements....

...but San Joaquin Valley has faced biggest hurdles



SGMA was enacted to address the negative consequences of groundwater overdraft



Lowering of
GW levels



Reduction of
storage



Land
subsidence



Seawater
intrusion



Surface water
depletion

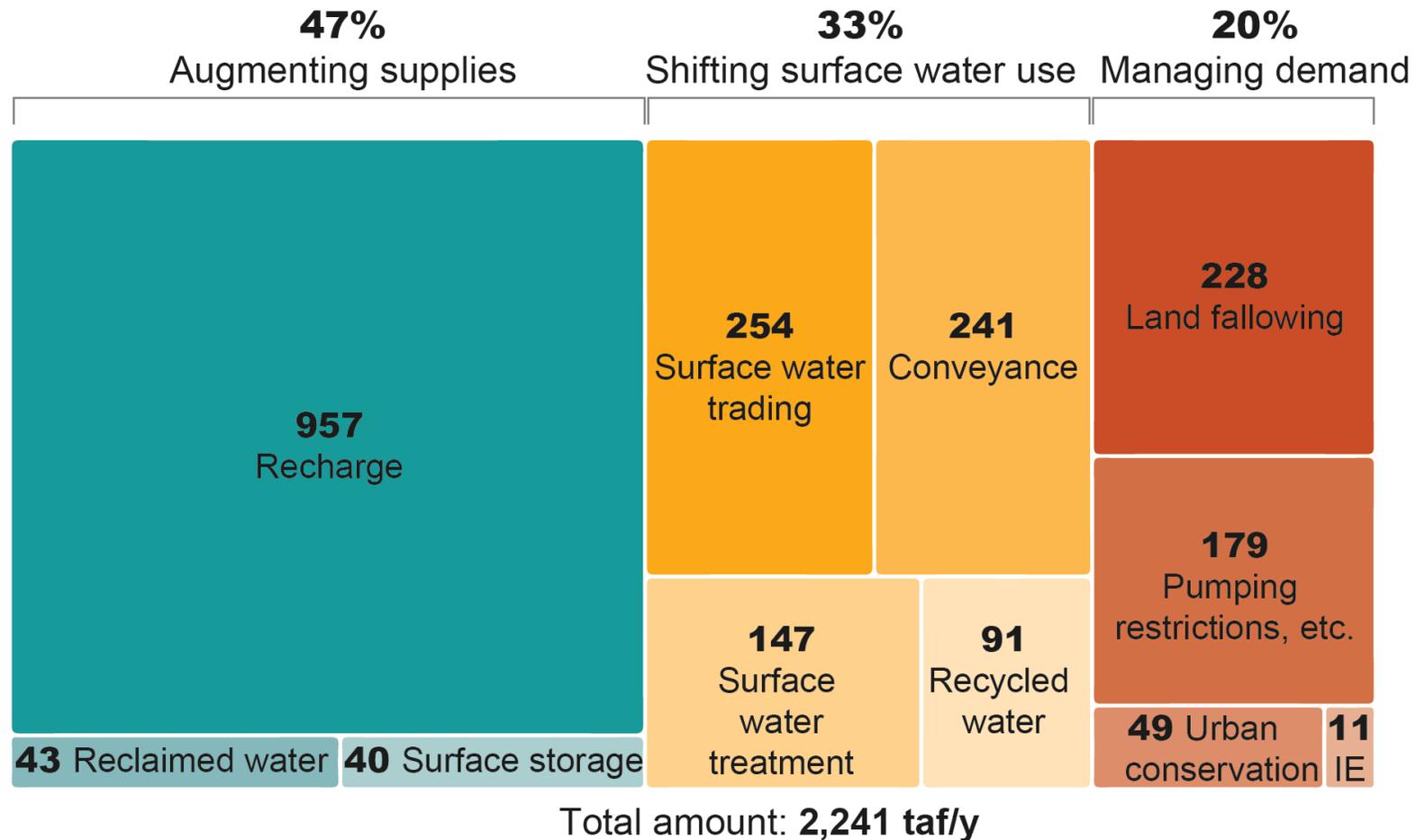


Degraded
quality

Many Valley plans were flagged for failing to address two key undesirable results



Valley plans emphasize recharge, and have limited focus on demand management



Source: Hanak et al. *A Review of Groundwater Sustainability Plans in the SJ Valley: Public Comments to DWR* (PPIC, 2020)

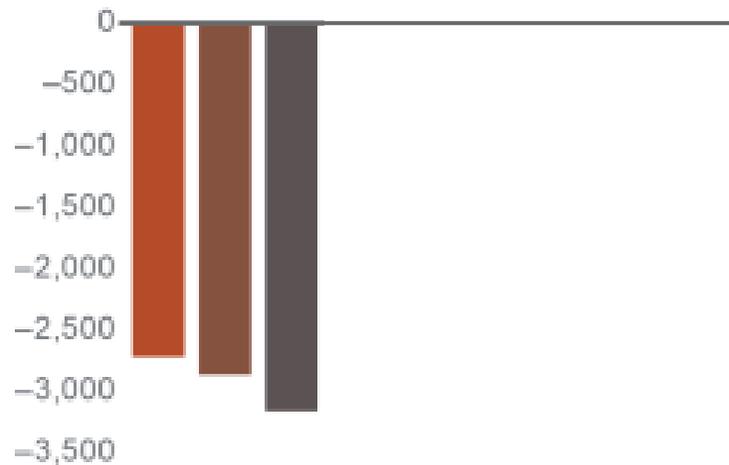
Agriculture is a key driver of San Joaquin Valley economy

- Average annual water supplies could decline 20% by 2040
 - 50,000 jobs lost, 2.3% decline in economic activity, up to 900K acres fallowed
 - Dust, pests, weed on fallowed lands
- Ways to soften the transition:
 - Improved water trading rules
 - Water infrastructure; recharge
 - Improved ag productivity
 - Productive uses for fallowed lands

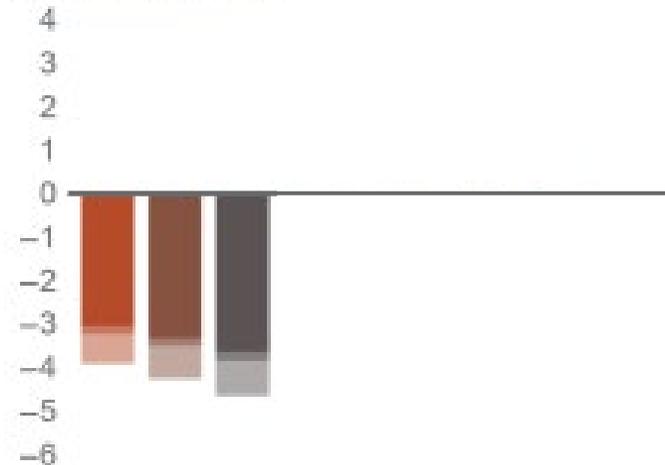


Water reductions by 2040 will reduce farm GDP (and jobs)

Reductions in applied water
(Thousands of acre-feet)



Agricultural GDP losses
(Billions of \$)



Scenario

- SGMA
- SGMA + Climate Change
- SGMA + CC + E-flows

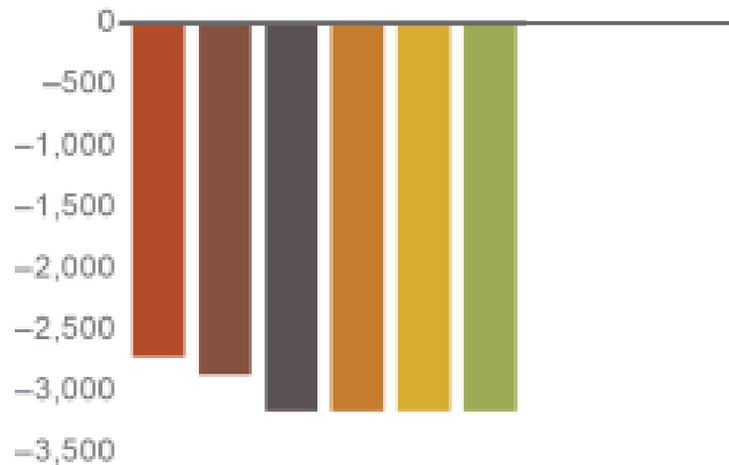
Economic Sector

- Crop production
- Dairy and beef products
- Processing industries

Source: Escriva-Bou et al. *The Future of Agriculture in the San Joaquin Valley* (PPIC 2023)

Water trading could significantly cushion the costs of water supply reductions

Reductions in applied water
(Thousands of acre-feet)



Agricultural GDP losses
(Billions of \$)



Scenario

- SGMA
- SGMA + Climate Change
- SGMA + CC + E-flows
- Local trading
- Basin trading
- Valley trading (surface water only)

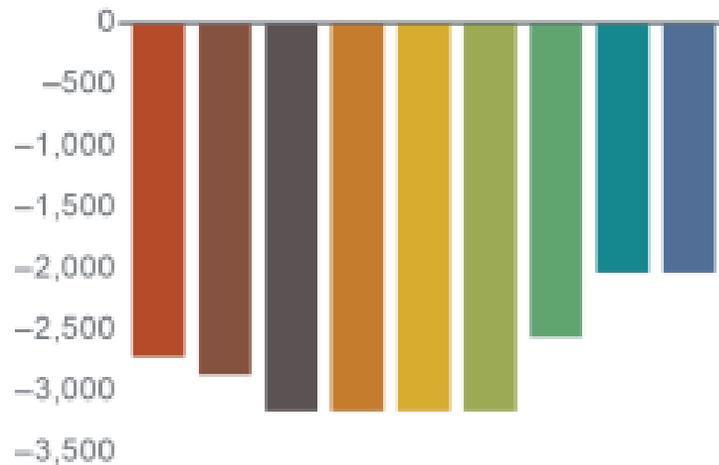
Economic Sector

- Crop production
- Dairy and beef products
- Processing industries

Source: Escriva-Bou et al. *The Future of Agriculture in the San Joaquin Valley* (PPIC 2023)

New supplies and increased productivity could further soften the blow

Reductions in applied water
(Thousands of acre-feet)



Agricultural GDP losses
(Billions of \$)



Scenario

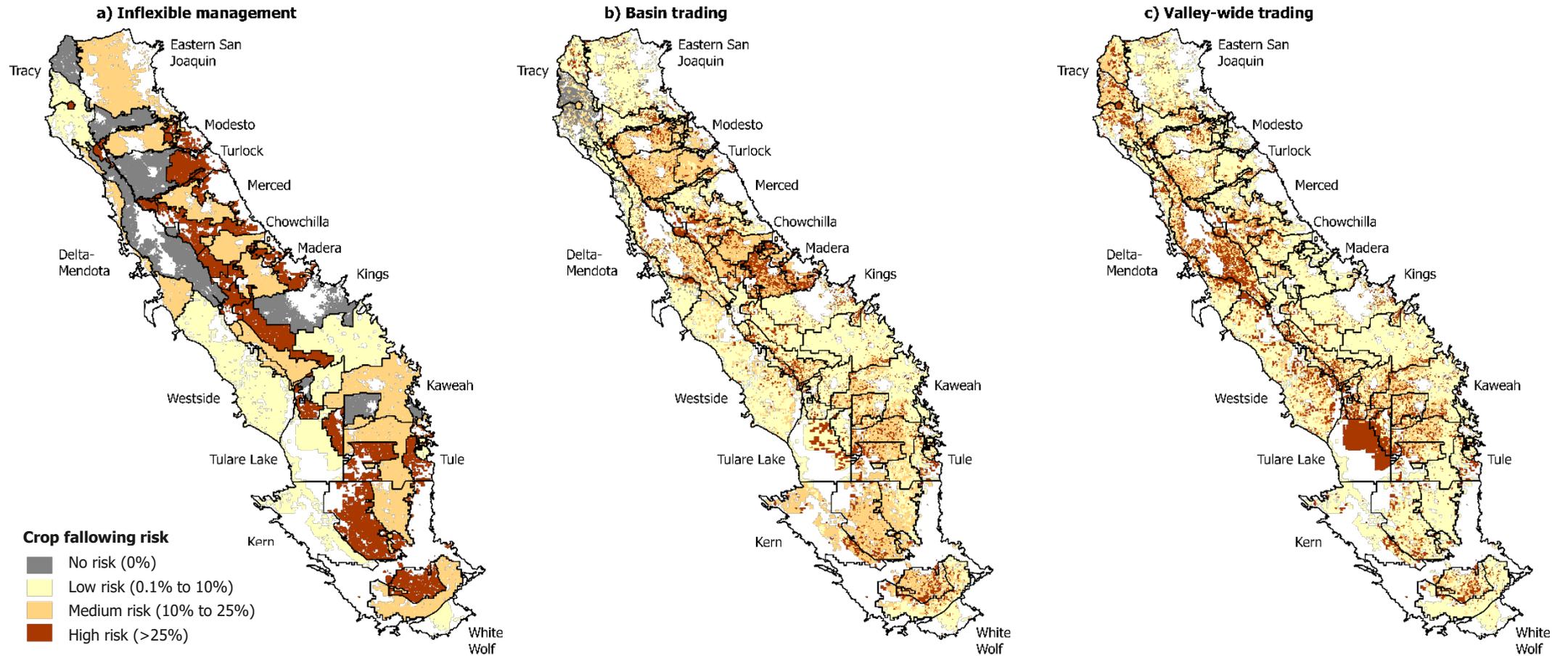
- SGMA
- SGMA + Climate Change
- SGMA + CC + E-flows
- Local trading
- Basin trading
- Valley trading (surface water only)
- Expanded supplies (0.5 maf)
- Expanded supplies (1 maf)
- Increased productivity
- ▨ Cost of new supplies

Economic Sector

- Crop production
- Dairy and beef products
- Processing industries

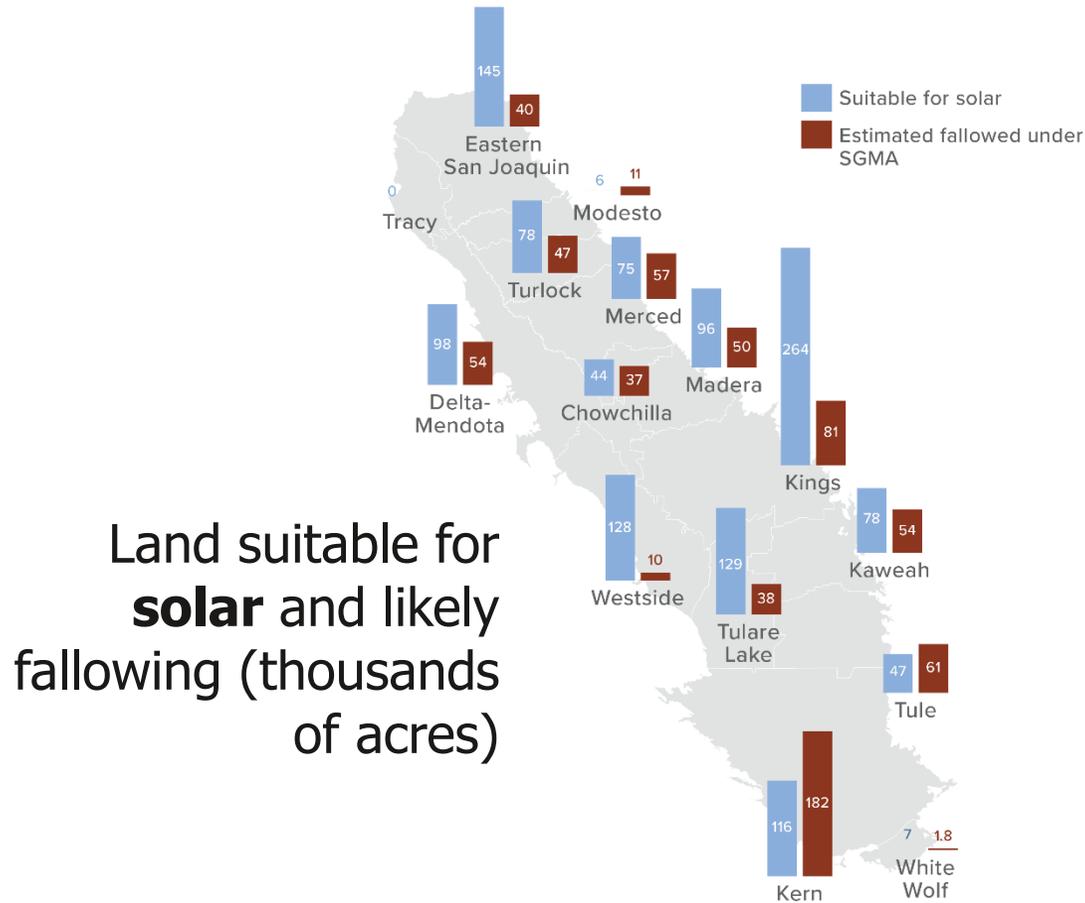
Source: Escriva-Bou et al. *The Future of Agriculture in the San Joaquin Valley*
([PPIC 2023](#))

Trading would shift the following risk, moving water to reduce costs of following



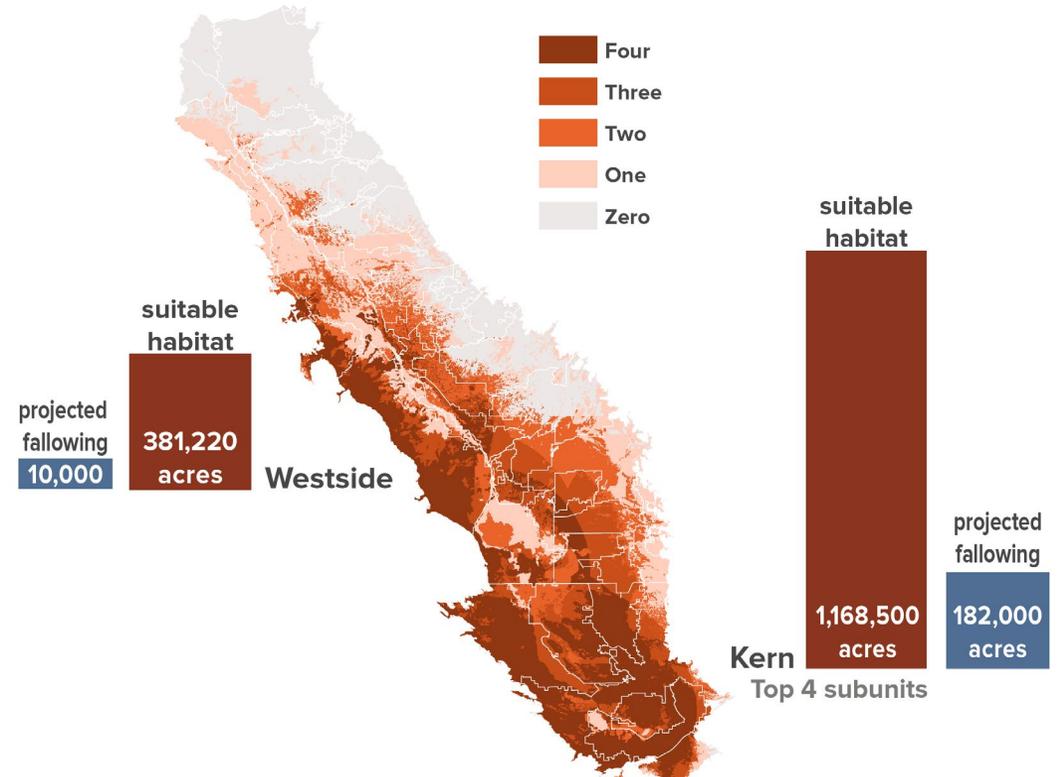
Source: Escriva-Bou et al. *The Future of Agriculture in the San Joaquin Valley* (PPIC 2023)

Many areas have solar energy and habitat assets



Land suitable for **solar** and likely following (thousands of acres)

Suitable **habitat** for San Joaquin Desert species

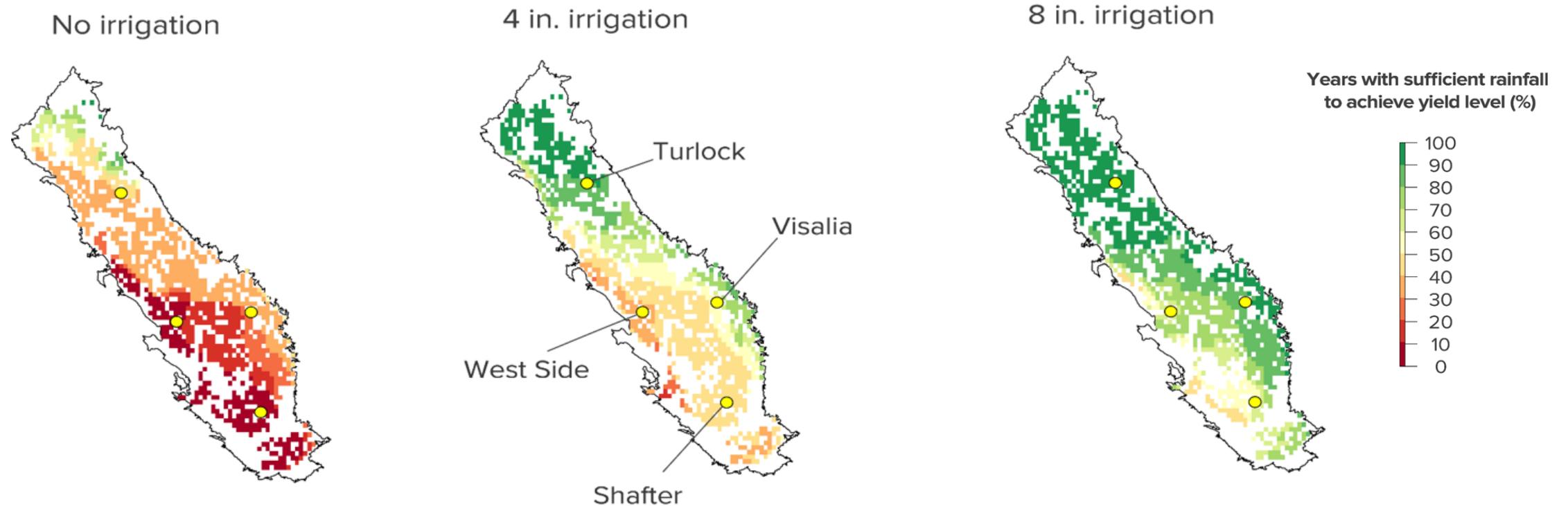


Source: Ayres et al. *SGMA and Solar Energy Development in the San Joaquin Valley* ([PPIC 2022](#))

Source: The Nature Conservancy, PPIC (map by Shayan Kaveh)

Other areas could be suitable for water-limited forage production

Five-ton forage yield (winter wheat)



Source: Peterson, Pittelkow, and Lundy *Exploring the Potential for Water-Limited Agriculture in the San Joaquin Valley* ([PPIC 2022](#))

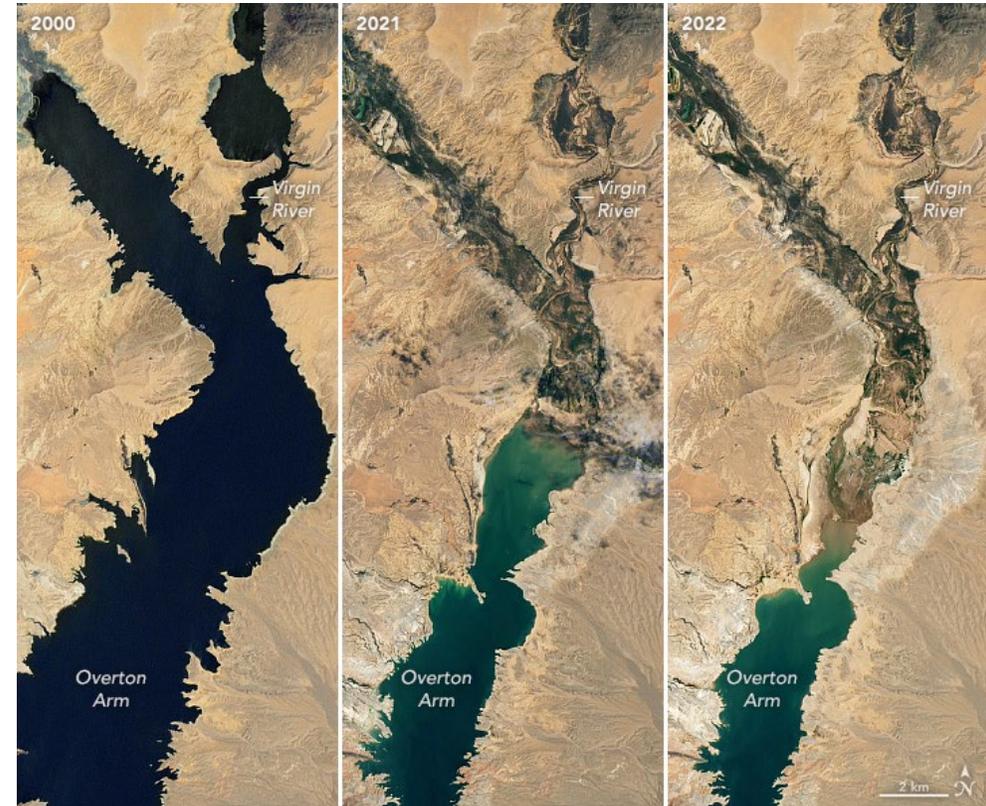
The big picture:

- SGMA is key for our future, but it will shrink our irrigated agriculture footprint
- Reduced water supplies will call for both supply- and demand-side adaptations
- Careful management can soften the blow:
 - Flexible water use (trading)
 - Investments in infrastructure, ag productivity
 - Incentives to productively repurpose ag lands



These same approaches will be key as the West adapts to dwindling Colorado River supplies

- Long-term drying of the basin, rapidly worsening conditions
- California has largest share, most senior rights
- But our urban, ag communities will need to adapt—as will those of other western states



Source: NASA Earth Observatory

Thank you!

