

Groundwater Policy and California Agriculture

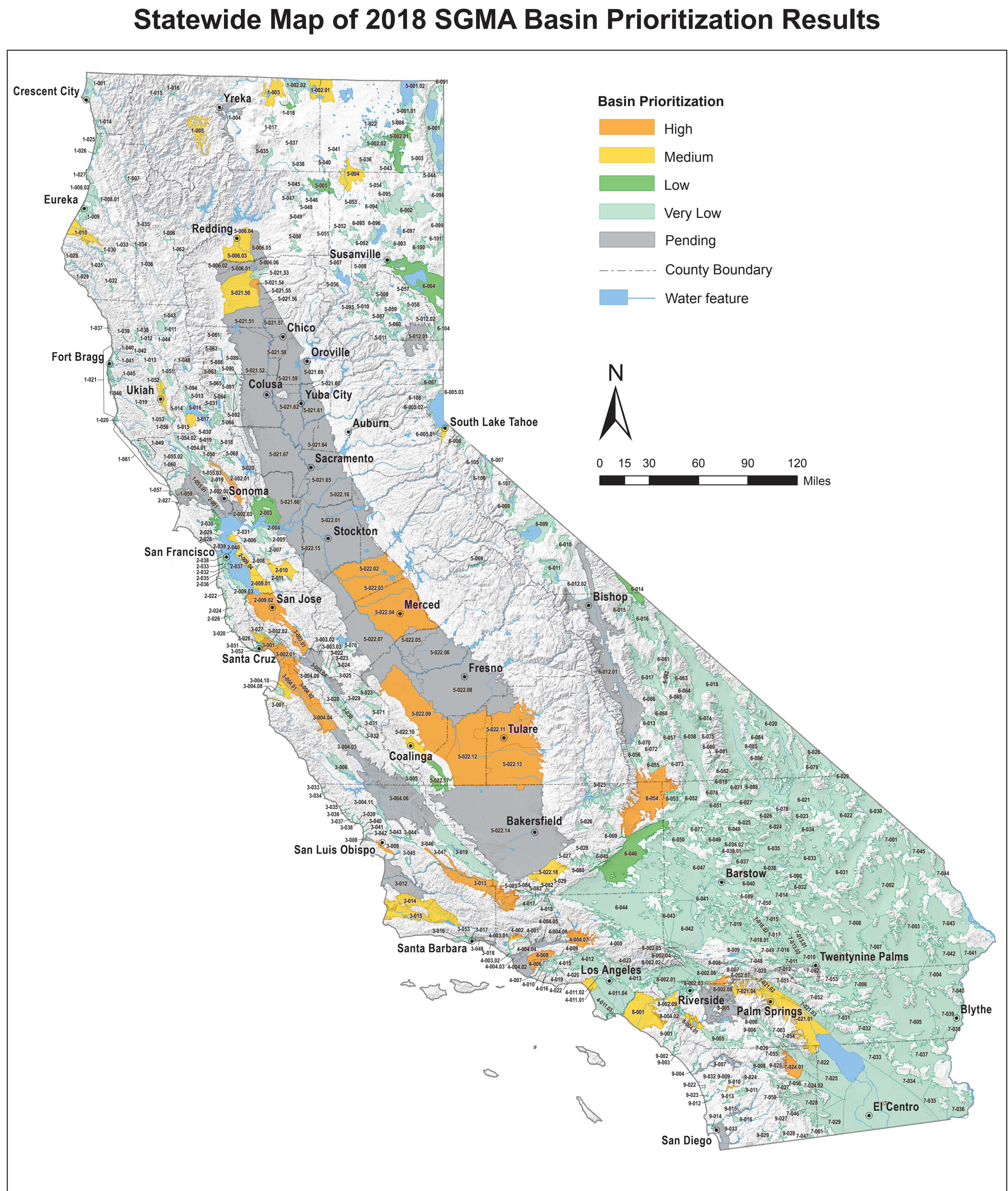
How will climate change and the Sustainable Groundwater Management Act (SGMA) shape the agricultural landscape of 2050?

Ellen Bruno (ebruno@berkeley.edu), Department of Agricultural and Resource Economics, UC Berkeley

Changing Water Landscape

In 2014, landmark groundwater legislation was passed that imposes a state-wide framework for newly created, local groundwater management agencies to reach and maintain groundwater sustainability. This regulation is far-reaching: the groundwater subbasins that are subject to SGMA account for over 90% of the state’s total groundwater pumping. These basins will be required to halt overdraft (declining groundwater levels) to avoid several undesirable results associated with overdraft. This will result in groundwater cut-backs of 20-50% for some basins.

Simultaneously, climate change threatens to increase water scarcity in California. We expect to see changes to the form of precipitation and timing of runoff, which will make it more difficult to capture and store surface water. Water supply from snowpack is projected to decline by two-thirds by 2050.



Note: High and medium priority basins must submit plans by 2020 and 2022, respectively. Priority level is based on population, number of wells, groundwater dependence, groundwater quality, and other factors. Many basin classifications are still pending due to requests for basin boundary modifications. For more information: <https://sgma.water.ca.gov>.

SGMA Timeline



Response from Agriculture

Agriculture will have to adjust to groundwater restrictions or higher water prices. We may expect to see:

- 1 a decrease in irrigation intensity
- 2 adoption of new conservation technologies
- 3 land fallowing and shifts toward less water-intensive crops
- 4 more trading of water with other farmers, cities

The magnitude of these adjustments will depend on the extent of groundwater restrictions, choice of management actions, availability of substitutes, crop prices, and other factors.

15 of Top 20 California Crops by Acreage: Revenue and Water Use

Crop	Total Acreage	Revenue per acre	Applied Water (AF/acre/yr)	Revenue per AF
Hay	1,200,000	\$645	3.5	\$184
Almonds	940,000	\$5,487	3.6	\$1,524
Grapes (all)	841,000	\$6,637	3.0	\$2,212
Rice	541,000	\$1,302	5.0	\$260
Walnuts	315,000	\$3,942	3.0	\$1,314
Tomatoes (all)	296,000	\$4,492	2.3	\$1,953
Pistachios	239,000	\$6,302	3.0	\$2,101
Cotton	218,000	\$1,643	2.5	\$657
Lettuce (all)	210,700	\$9,304	1.2	\$7,753
Oranges	157,000	\$5,263	2.5	\$2,105
Broccoli	123,000	\$6,335	1.7	\$3,726
Lemons	47,000	\$12,636	2.9	\$4,357
Strawberries	37,900	\$48,411	2.3	\$21,048
Peppers (all)	26,700	\$18,606	2.0	\$9,303
Raspberries	10,300	\$36,937	1.8	\$20,184

*Excluding dairy, livestock, carrots, tangerines. Revenue and acreage come from the CDFA's Agricultural Statistics Review 2016-2017. Data on average applied water per acre by crop (acre-feet per year) come from UCCE Cost and Return Studies.

Biggest Challenges

- 1 For groundwater agencies: Generating equitable and effective basin management plans that maximize the well-being of those that depend on groundwater. Agencies are facing myriad regional groundwater allocation issues.
- 2 For policymakers: Understanding the heterogeneous impacts of SGMA to agriculture, which will vary by the degree of overdraft and the management decisions made at the local level. More generally, we need to identify and implement effective strategies to adapt to a changing water landscape.