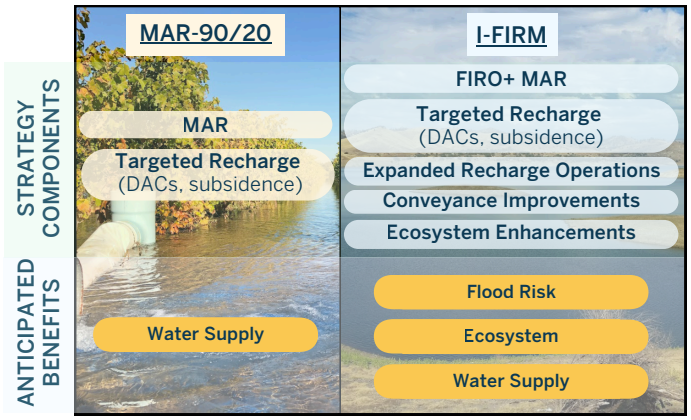
STANISLAUS WATERSHED - AT A GLANCE

Sustainable Conservation

A CHANGING CLIMATE: By 2050, rising temperatures are expected to create more intense winter storms and limit snowpack in the Stanislaus watershed, reducing runoff in the dry season when farms, communities, and ecosystems need it most. Warming will also increase evaporative demand and shrink surface water supplies, increasing reliance on groundwater. Without action, groundwater levels will fall and flood risks will intensify.

FLOODWATER AS A RESOURCE: The San Joaquin Basin Flood-MAR Watershed Studies evaluated the opportunity for Flood-Managed Aquifer Recharge (Flood-MAR) and Forecast-Informed Reservoir Operations (FIRO) to mitigate the impacts of climate change. Working with growers, Flood-MAR can be scaled to capture more wet season flows in recharge basins and on farmland, thereby reducing flood risk and rebuilding groundwater stores for the dry season.



What is Impacted by Climate Change?

Groundwater Supply

By 2050, average annual groundwater overdraft is expected to double to 10,000 acre-feet per year. Groundwater levels will fall by an average of 6 feet, and groundwater levels beneath Disadvantaged Communities (DACs) will fall by 4 feet.

What can Recharge Accomplish?

Compared to the baseline future scenario, MAR-90/20 would reduce annual groundwater overdraft by 10% and increase groundwater levels by 33%. I-FIRM would reduce annual overdraft by 30%, raise average groundwater levels 1 foot above current levels, and return groundwater levels below DACs to current levels.

Flood Risk

By 2050, the maximum peak flow of the Stanislaus River is expected to remain at 8,000 cubic feet per second (cfs). The number of years in which flows exceed the channel operational capacity of 5,000 cfs remains at 23 years per 100, while the maximum duration of flows exceeding operational capacity increases by 47%.

What can Recharge Accomplish?

Compared to baseline future, MAR-90/20 would have negligible impacts on flood risks. Under I-FIRM, maximum peak flow is reduced to 5,700 cfs, and the frequency and duration of events exceeding operational capacity are greatly reduced.

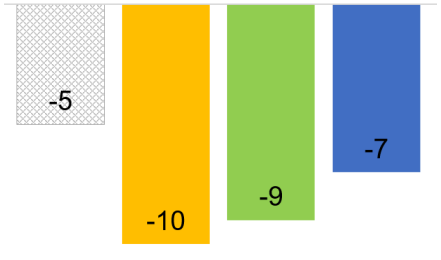
Ecosystems

By 2050, increased winter river flows are not expected to affect instream salmonid habitat, where salmon need low flows to lay eggs and raise juveniles. However, higher peak flows could greatly improve off-channel floodplain habitat, where salmon feed before outmigration to the sea. Groundwater-dependent ecosystem (GDE) habitat is not impacted.

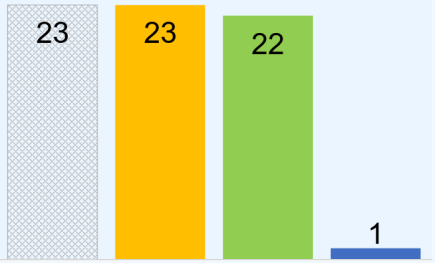
What can Recharge Accomplish?

MAR-90/20 has no impact on instream salmonid habitat but reduces potential off-channel habitat by shaving off peak flows. I-FIRM has minimal effects on instream habitat as well, but further reduces potential off-channel habitat as MAR diversions increase. Neither strategy affects GDE habitat. I-FIRM creates new shorebird and flow-through basin habitat in the watershed.

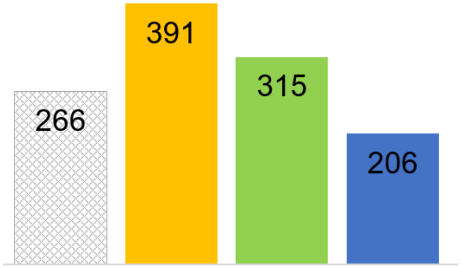
Average Annual Groundwater Overdraft
[TAF/Y]



Years Exceeding Design Channel Capacity
[per 100 years]



Potential Off-Channel Salmonid Habitat
[acre-days per linear mile]



Baseline Current Baseline 2050 MAR-90/20 I-FIRM

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SCENARIO OUTCOMES

In a Baseline Future

- GW overdraft increases
- Flood risk increases somewhat
- Ecosystems see some improvements

With MAR-90/20

- Increase in GW overdraft is lessened
- Flood risk remains moderate
- Ecosystems see mixed outcomes

With I-FIRM

- Increase in GW overdraft is lessened further
- Flood risk is greatly reduced
- Ecosystems see mixed outcomes

PLANNING FOR THE FUTURE

Strategic Flood-MAR implementation in the near-term can reduce groundwater overdraft in the region while providing additional benefits, such as supporting groundwater levels near DACs, and addressing the cone of depression. FIRO-MAR will take longer to implement, but it can mitigate some of the most severe climate change impacts expected in the Stanislaus watershed.

To achieve multi-benefit watershed-scale outcomes, collaboration will be essential. Growers, water districts, Groundwater Sustainability Agencies, reservoir operators, flood control agencies, community groups, and environmental organizations must coordinate to develop and pilot management strategies and build system resilience.

Scaled MAR will depend on greatly expanded on-farm recharge in the Stanislaus watershed, so grower involvement in project planning and implementation will be essential.

These studies help us envision how Flood-MAR can help shape California's water future. However, they rely on one set of assumptions and focus specifically on what is possible with recharge. Additional management actions such as land repurposing are not discussed in these studies but will be necessary to meet long-term groundwater sustainability goals.

Ultimately, local water and land managers, large- and small-scale growers, and residents of the Stanislaus watershed will shape real-world outcomes for the region.

Whether you are a grower, water manager, community member, environmental advocate, or another interested party, you can play a role in building resilience to a changing water future in the Stanislaus watershed. Sustainable Conservation has resources to help you learn more about Flood-MAR, and can connect you with partners to promote MAR in your area. Water managers can use a locally developed Groundwater Recharge Assessment Tool (GRAT) developed as part of the Watershed Studies toolset to plan recharge efforts that target benefits based on local priorities. Visit suscon.org and groundwaterrecharge.org for more information.

SCAN FOR MORE RESOURCES

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Runoff to Recharge .....