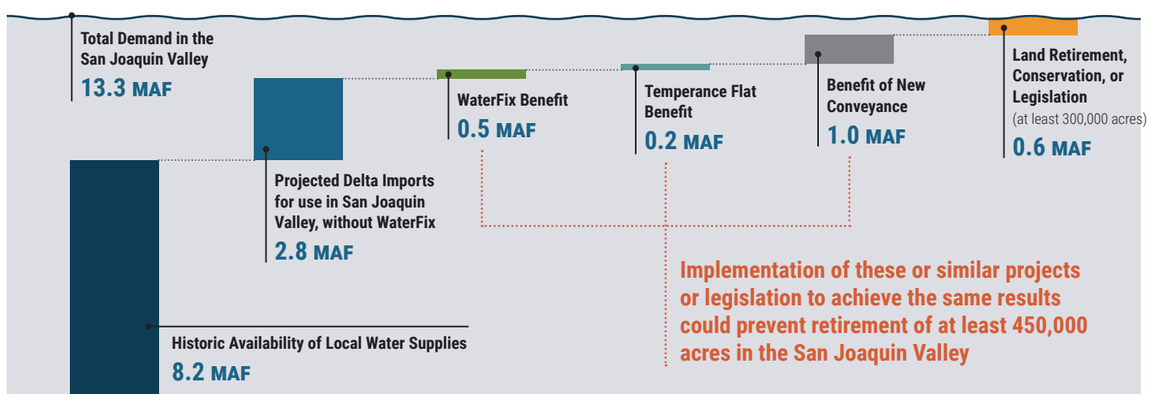
MOVING FORWARD

The San Joaquin Valley is running out of time to reach sustainability and end the overdraft of groundwater. The solutions, however, are not entirely in the hands of those in the Valley. State and federal elected officials and agencies ultimately dictate the ability to implement the solutions necessary to solve the problems. We should not overcomplicate this, the math is simple and the solutions are limited. Too many interest groups have been distracting decision-makers with potential solutions that won't solve the problem (e.g., conservation) and potential environmental impacts of water resource operations that are either overstated or could be mitigated without further reductions to water supplies.

CLOSING THE GAP: MAXIMIZING OUR RESOURCES PORTFOLIO TO MINIMIZE LAND RETIREMENT



THE TIME IS NOW FOR THE STATE AND FEDERAL ADMINISTRATIONS, CALIFORNIA LEGISLATORS, AND THE U.S. CONGRESS TO TAKE CLEAR AND TRANSPARENT POSITIONS ON HOW THEY WANT TO SOLVE THIS PROBLEM.

FRIANT WATER AUTHORITY

For more information or media inquiry, please contact: info@friantwater.org

Download a PDF of this handout here: http://bit.ly/Friant-Balance

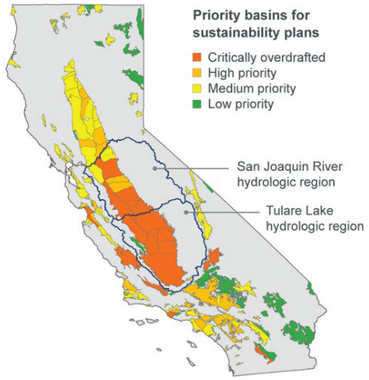
A VALLEY IN CRISIS

Water Imbalance in the San Joaquin Valley

2017 brought near record setting precipitation and the over-due reprieve from California's most severe drought on record. Despite the welcome rain, the compounded effects of the recent drought and three decades of increasing regulatory pressure on water resources have left the San Joaquin Valley in a state of severe overdraft. In fact, California's most urgent groundwater issues exist in the San Joaquin Valley, where the greatest extent of "Critically Overdrafted" basins exist. (See DWR figure to right.)

For decades, the successful design of the Friant Division's conjunctive use project had insulated its water users from the problems of an eroding water supply reliability throughout the San Joaquin Valley. This is no longer the case. The extent of groundwater overdraft in the San Joaquin Valley connects all of the valley's water users in an urgent effort to comply with California's Sustainable Groundwater Management Act (SGMA). Friant water users have water contracts that presumed access to groundwater that is changing with SGMA implementation. Consequently, Friant districts are now drawn into the imbalance of the entire valley and the need to develop solutions.

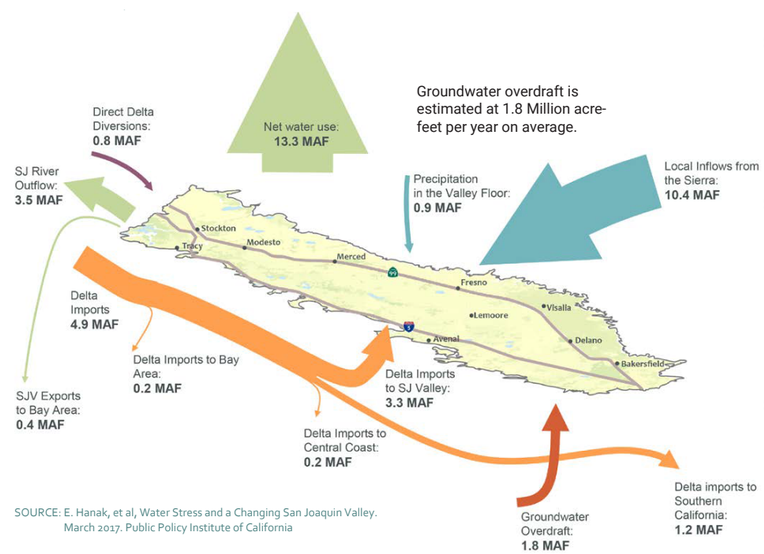
The reasons for this problem are complex, but the math is simple. The graphic below, developed by the Public Policy Institute of California in March of 2017, illustrates average conditions for water supply and demand that have contributed to imbalance in the San Joaquin Valley.



SOURCE: California Department of Water Resources

Four Factors Drive the Water Imbalance

AVERAGE ANNUAL WATER-BALANCE FOR RECENT DECADES (1986-2015)



SOURCE: E. Hanak, et al, Water Stress and a Changing San Joaquin Valley. March 2017. Public Policy Institute of California

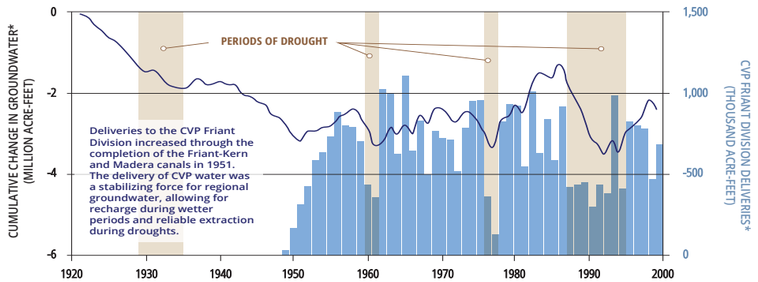
1. **Net water use, 13.3 million acre-feet per year (MAF). This is the historical "demand" for water in the San Joaquin Valley, principally driven by agriculture, but inclusive of cities like Fresno and dozens of disadvantaged communities that support the agricultural economy.**
2. **San Joaquin River Outflow, 3.5 MAF. Releases to the San Joaquin River are tightly managed and driven largely by regulatory requirements that are becoming more stringent for all of the rivers that flow to the Delta. California's State Water Resources Control Board (Water Board) is considering increasing outflow requirements to 40 percent of natural inflow.**
3. **South of Delta Imports, 4.9 MAF. Imports are subject to future reductions as species in the Delta decline. Imports are expected to diminish to 3.8 MAF in the decades ahead in a continuation of policies aimed at restoring aquatic ecosystems that have been failing – despite increasing reductions in imports – for the past 30 years. This means the San Joaquin Valley can expect further reductions in surface water by perhaps 0.5 MAF in the short-term.**
4. **Groundwater Overdraft, 1.8 MAF. Overdraft expresses the scale of water imbalance of the San Joaquin Valley. Groundwater is drafted to backstop shortfalls in surface water, but is being extracted at rates that exceed replenishment, hence the term "over" draft. With the expected reductions in South of Delta Imports, imbalance in the valley would increase to 2.9 MAF per year. The imbalance could grow further still, if the Water Board requires additional outflows from the San Joaquin River and its tributaries.**

THE VALLEY'S GROUNDWATER IS OF VITAL IMPORTANCE TO FRIANT

Overdraft occurs when groundwater is extracted faster than it is replenished. Overdraft, if done only in dry years, can be part of a balanced conjunctive use project. The Friant Division, as one example, was designed with the expectation that groundwater would serve as a backstop for dry conditions, and that heavy surface water deliveries in wet years would allow the regional groundwater to replenish.

The Friant Division was designed to bring stability to groundwater in the eastern San Joaquin Valley, which was threatened in the 1930s by decades of groundwater overdraft. The Friant Division's two canals – the Friant-Kern and the Madera – deliver high-quality surface water from the San Joaquin River to supports crops and cities, and in doing so brought balance to groundwater within the region for over 50 years. For a half-century, the Friant Division maintained a stable surface and groundwater supply that supported a world-class agricultural sector that in turn supports numerous communities and businesses. (See figure to the right.)

WATER DELIVERIES TO THE FRIANT DIVISION KEPT REGIONAL GROUNDWATER STABLE THROUGH MULTIPLE CYCLES OF DROUGHT



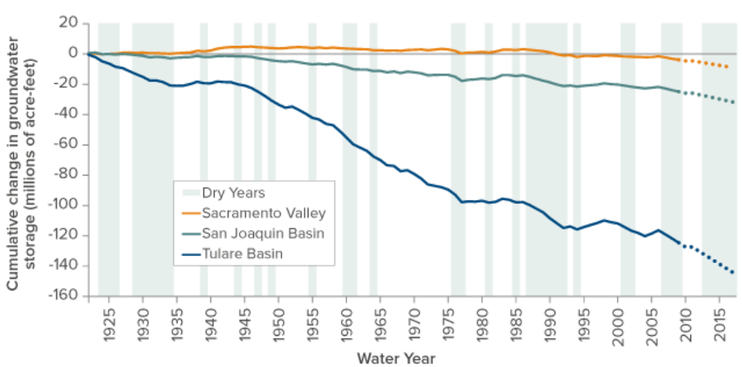
*Conditions represented for eleven Friant Division contractors with early participation in the CVP, and collectively representing about half of the Friant Division (55-percent of Class 1 and 46-percent of Class 2 contracts). Information for the combination of conditions at: Delano-Earlimart Irrigation District (ID), Ivanhoe ID, Lindmore ID, Lower Tule ID, Porterville ID, Saucelito ID, Shafter Wasco ID, South San Joaquin Municipal Utility District, Stone Corral ID, and Tulare ID.

However, changes in recent decades have eroded the previous stability of the Friant Division. Challenges include the record-setting drought, implementation of a settlement agreement that reduces Friant water supplies to restore salmon below Friant Dam, and sustained regional groundwater overdraft throughout the greater San Joaquin Valley. Together, these factors have impacted the ability of the Friant Division to serve the eastside of the San Joaquin Valley.

THE PERILS OF SUSTAINED REGIONAL GROUNDWATER OVERDRAFT

Groundwater connects nearly all water users in the San Joaquin Valley, including the Friant Division. The valley has experienced sustained groundwater overdraft for the past century, exacerbated by reductions in South of Delta Imports and development of additional lands that lack access to surface water (also known as "White Lands" because they appear as blank spaces on maps depicting districts with surface water).

The San Joaquin Valley as a whole has experienced sustained overdraft for the past century, evidenced by groundwater storage for the San Joaquin and Tulare basins.



SOURCE: Historical data through 2009 from the California Department of Water Resources; PPIC estimates after 2009. E. Hanak, et al. "What if California's Drought Continues?" August 2015. Public Policy Institute of California.

Sustained overdraft leads to significant problems such as the dewatering of wells (as experienced by communities throughout the valley in 2016) and land subsidence – where the voids that otherwise contain water in aquifers physically collapse. Dewatered wells can leave communities and farmers without any dry-year water supplies and result in a race to drill deeper and deeper wells – at least for farms and communities that can afford the expense. Land subsidence can permanently reduce the holding capacity of aquifers, and the physical displacement of the terrain can damage roads, bridges, and canals. In the past two years alone, segments of the Friant-Kern Canal have subsided almost three feet; these segments now convey less than 40 percent of their designed operating capacity.

Download materials on subsidence effects on the Friant-Kern Canal, here:

http://bit.ly/FKC-Sub17

A LOOK AT THE OPTIONS: SOLUTIONS FOR IMBALANCE IN THE SAN JOAQUIN VALLEY

To address groundwater overdraft, the California Legislature enacted the Sustainable Groundwater Management Act (SGMA) in 2014. This legislation directs local agencies and stakeholders to develop and implement strategies to sustainably manage their groundwater resources by specified dates. If local agencies fail to act, SGMA directs the State to intervene. The SGMA legislation is intended to guard against the undesirable effects of sustained overdraft, such as subsidence and dry wells.

Imbalance in the San Joaquin Valley, as estimated earlier, is in the range of 2 to 3 million acre-feet per year. Putting things simply, there are two general strategic approaches that can reduce this deficit and protect the groundwater of the San Joaquin Valley: 1) reduce groundwater use, and/or 2) increase surface water recharge. In truth, a combination of these strategies will be needed.

STRATEGIC APPROACH 1

REDUCING TOTAL GROUNDWATER USED

Of the methods for reducing groundwater use, the following three approaches are perhaps the most prevalent in discussions for how to manage the demand for groundwater in the San Joaquin Valley.

Water Recycling. Does recycling water, including using treated wastewater that would otherwise flow into the rivers help? Answer: Maybe. It all depends on timing. If recycling occurs when there are otherwise flow requirements in the rivers, the reduced inflows to the rivers will likely result in a need to increase releases from upstream surface storage reservoirs.

Water Conservation. The math seems straightforward: if less water is used on crops (or lawns and showers), the overdraft problem would be reduced, right? Answer: Not entirely. Simply using less water on an acre of irrigated land, for example, may only reduce the water recharging the groundwater below. So, although conservation can be an important tool, especially during droughts, there is no net benefit to the groundwater overdraft problem through conservation unless there is a concurrent reduction in the acreage of irrigated crops (or lawns). This is known as land use changes or land retirement.

Land Use Changes or Retirement. In most cases, changing the use of irrigated land to reduce or eliminate the need to use water can help with groundwater overdraft, so long as the water that would have otherwise been used is not used for exports or increasing outflows from the San Joaquin Valley. Although it varies by crop and cultural practices, land retirement can reduce groundwater overdraft between 2 and 5 acre-feet per acre of land retired. The impacts of land retirement are significant, as reduced agricultural activity directly affects the State and local economies. Further, agriculture jobs tend to be concentrated in disadvantaged communities, where few alternatives for employment exist, placing these communities at an elevated risk.

The Recharge Challenge

A critically important point is that *increases* in surface water must come from flows that are otherwise unnecessary for meeting regulatory streamflow requirements, such as outflows to the ocean. If they are, then a like amount of water will need to be released from storage to meet the flow requirement and the net result is *no benefit to recharging groundwater*.

STRATEGIC APPROACH 2

INCREASE SURFACE WATER USE TO RECHARGE GROUNDWATER

Additional surface water can be used to increase groundwater recharge by either (a) ponding up surface water on land and allow the water to infiltrate into the ground, which can have benefits for wildlife, or (b) reductions in pumping groundwater and instead use a like amount of additional surface water. This second method, known as "in-lieu recharge," is the most effective way to immediately reduce overdraft without retiring land.

How can we develop NEW surface water to help the problem?

Capturing more surface water in the Valley. The only NEW surface water that can be captured from the Valley is water not required to flow out to meet regulatory requirements. Such water is available during wet years, which only occur three or four years out of every 10 years on average. There are many ways to capture and convey this surplus water for groundwater recharge. Studies have shown that the likely maximum amount of additional surplus surface water that could be captured and used to offset groundwater overdraft is in the range of 100 to 400 thousand acre-feet per year. To capture the higher end of that range would require a significant increase in surface storage on the San Joaquin River above Millerton Lake.

Improving water reliability from the Delta. A core purpose of both the Friant Division and the Central Valley Project was to reduce groundwater overdraft in the San Joaquin Valley with additional surface water from the Delta. Current water delivery obligations from the Delta Imports are approximately 7.4 million acre-feet. However, the current annual average delivery is only projected to be 4.1 million acre-feet. The proposed California WaterFix tunnels are intended to deliver water more effectively South of the Delta and could increase reliability of Delta Imports by by as much as 1 million acre-feet, of which about 0.5 million acre-feet would remain to the San Joaquin Valley. The only other way to increase this reliability is by changing regulations that have required more flows from reservoirs to bypass the pumps in the Delta, which are in place to increase habitat for fish. Federal legislation could increase the reliability of Delta deliveries by approximately 1 million acre-feet per year, and with appropriate application of science or investment in core habitat needs, can be done without significant impacts to Delta species.