



# SUBSIDENCE — A CRITICAL CHALLENGE TO FRIANT-KERN CANAL WATER DELIVERIES



The Friant Water Authority is facing a critical challenge right now -- one that has **reduced our ability to deliver water to many Friant Division Contractor's by nearly 60%**. It is a challenge that must be met today if we are to ensure our long-term commitment to delivering high-quality, dependable water, in the amounts needed by farmers and cities in the San Joaquin Valley.



## Alarming Signs of Subsidence

Evidence of subsidence was noticed when, at full capacity, water in the canal was running up against bridges it would normally pass under quite easily.

The picture on the left shows water passing under the bridge at Road 96 as it likely looked prior to the most recent subsidence. The picture on the right shows water hitting the bridge at Road 96 under similar flow conditions.

## A Legacy of Innovative Water Management

The Friant Division was designed to bring stability to the San Joaquin Valley's groundwater supply, which was threatened at the beginning of the 1900s by decades of groundwater pumping. The Friant Division's two canals – the Friant-Kern and the Madera – source high-quality surface water from the San Joaquin River that supports crops, cities, and groundwater recharge. This investment to establish the Friant Division has paid off by providing stable surface and groundwater supplies that created and sustain a world-class agricultural sector that in turn supports numerous communities and businesses. But in recent years, several challenges have reduced the ability of the Friant Division's existing infrastructure to serve its intended purposes.

## The Challenge

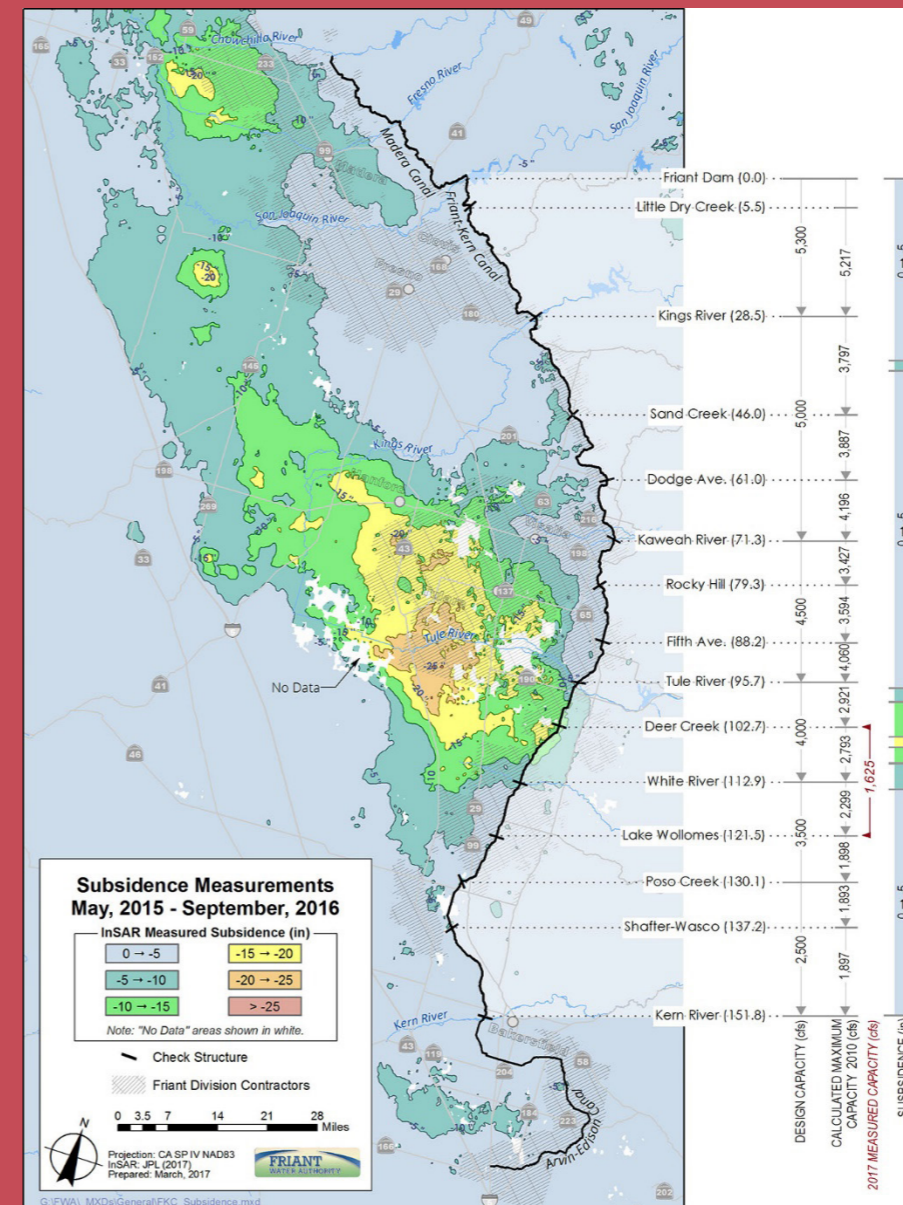
In early 2017, Friant Water Authority discovered a problem related to land subsidence that affects the Friant-Kern Canal's carrying capacity and its ability to deliver water to Friant contractors near the southern portion of the canal.

## Subsidence and Canal Operations

The Friant-Kern Canal was designed as a gravity-fed facility and does not rely on pumps to move water. Subsidence (which is the gradual sinking of an area of land) has caused parts of the canal to sink in relationship to others parts. This negatively affects the canal's ability to convey water. When the land elevation lowers, the canal must be operated at a lower flow-stage to ensure that water doesn't overflow the banks.

## Drought is the Driving Factor

From 2012-2017, California weathered its worst drought on record at the same time that increasingly stringent environmental regulations required more surface water to flow to the ocean. This forced San Joaquin Valley water users to rely heavily on groundwater supplies. In addition, in 2014 and 2015, the Bureau of Reclamation made a decision not to allocate to Friant Contractors their water supply from the San Joaquin River. This action caused most Friant districts to rely solely on groundwater resources to maintain their crops and protect decades of investments in what is among the highest-value, highest-production agricultural areas in the world.



The graphic shows the areas of subsidence along the Friant-Kern Canal and the degree to which canal capacity has been compromised from its original design.

The darker blue, green and yellow shown in the far left bar are the areas of highest subsidence along the Friant-Kern Canal. The area of greatest subsidence is between the Tule River and Lake Woollomes, particularly in the area of Deer Creek.

The graphic shows that in that section of the canal the current capacity has been reduced to only 40 percent of designed capacity, with a significant portion of that loss happening in the last 6 years.

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## **What Does Canal Subsidence Mean to You?**

It means that even in 2017 – one of the wettest years on record in the San Joaquin River basin – Friant Water Authority cannot physically move the amount of water we should be able to deliver to farms and communities on the San Joaquin Valley's eastside. It means that the Friant Division cannot operate to its full capability or in the way it was designed.

## **Is This a New Problem?**

The Friant-Kern Canal's carrying capacity has been compromised by various factors, including subsidence, since it began operation in 1951. In the past, water managers could manipulate canal operations to help mitigate some of the lost capacity. However, the new problem that emerged in 2017 is driven by rapid and severe land subsidence in the Corcoran/Tulare Basin areas, which are adjacent to the Friant-Kern Canal near Deer Creek. During 2015-2016, land elevations have dropped by two feet near Corcoran. There

is no way to operate the canal to eliminate impacts to water users caused by this amount of subsidence.

## **Impacts to Contractors**

All Friant Contractors who rely on the Friant-Kern Canal will be affected by changes in operations necessary to cope with the subsidence problem as reduced capacity along the canal will likely impact long-standing transfer or exchange partnerships among Friant Contractors, which have helped to balance water supply throughout the Friant Division. The Contractors downstream from the subsidence area (including Arvin-Edison WSD, Shafter-Wasco ID, South San Joaquin MUD, Kern-Tulare WD, Delano-Earlimart ID, Terra Bella ID, Saucelito ID, and Tea Pot Dome WD) will be most affected, however, because they may not get the amount of water they want during the time they need it. This may require farmers to turn to groundwater to make up for the shortage, which could exacerbate the subsidence that is causing the problem in the first place.