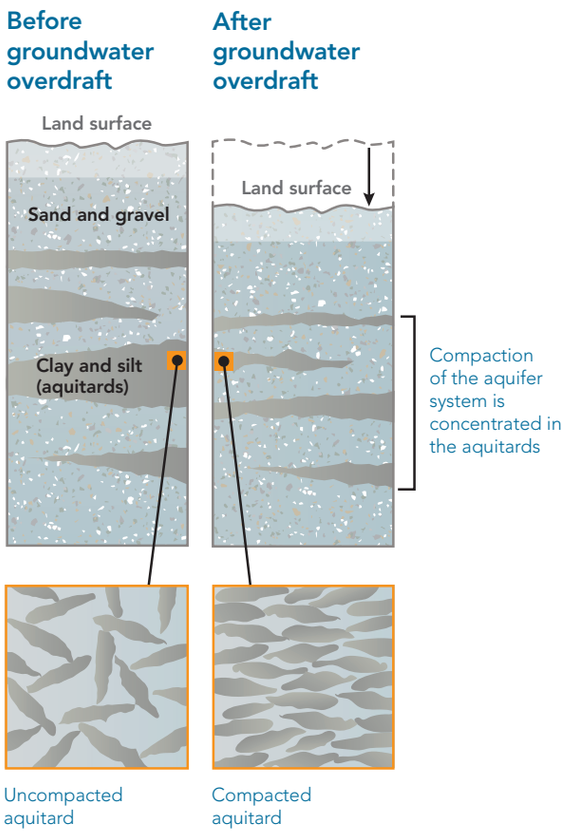
California's Sustainable Groundwater Management Act (SGMA)

Land Subsidence

NO. 5
UNDESIRABLE RESULT

Land subsidence damages infrastructure and reduces groundwater storage.

Land subsidence is a decline in land surface elevation which may occur due to various factors, including groundwater pumping. In areas with specific underlying geologic conditions, subsidence can damage important infrastructure and cause the permanent loss of groundwater storage capacity. SGMA requires that Groundwater Sustainability Plans (GSPs) set forth actions to limit significant and unreasonable land subsidence in basins where it has occurred due to groundwater pumping.



Subsurface geologic conditions determine vulnerability to subsidence.

Subsidence is not prevalent in all groundwater basins or uniform in all areas of an affected basin. Most groundwater basins in California are comprised of sand and gravel aquifers (water-bearing layers that allow groundwater flow) and fine-textured silt and clay aquitards (layers that retard groundwater flow).

Land subsidence can occur when groundwater pumping reduces the pore-water pressure in aquitard layers with high proportions of clay minerals, which causes the individual clay grains to re-orient and collapse, resulting in deformation that may permanently reduce its groundwater storage capacity. This "compaction" deep underground causes the land surface to subside, sometimes rapidly during a severe drought, or progressively over years and decades. Often, aquitards do not uniformly compact, damaging infrastructure which depends on a stable foundation.

Why does land subsidence matter?

What is the role of my GSA in preventing land subsidence?

How does land subsidence occur?

Will land subsidence affect me and my community?

Land subsidence can cause permanent deformation (i.e., sinking) of the ground surface that can seriously damage infrastructure, including water conveyance systems, roads, bridges, building foundations, wells, and levees. Damage to infrastructure can require costly repairs. For example, subsidence has significantly reduced the flow capacity of water conveyance infrastructure in some parts of California (requiring pumps in locations where flow has been disrupted), increased delivery and maintenance costs, and decreased delivery reliability.

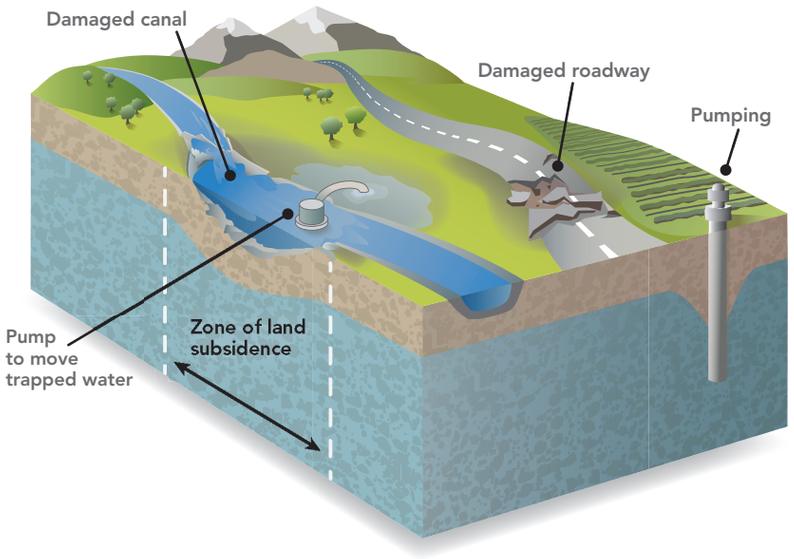
How can we monitor land subsidence to demonstrate the success of our Groundwater Sustainability Plan?

The GSP will describe a monitoring effort using remote sensing and/or G.P.S. technology to assess subsidence of the land surface in susceptible basins. The GSP will establish a monitoring program to assess the success of planned actions to stabilize land subsidence. Those actions may include efforts to stabilize groundwater levels via either pumping reduction, managed aquifer recharge, and other approaches.

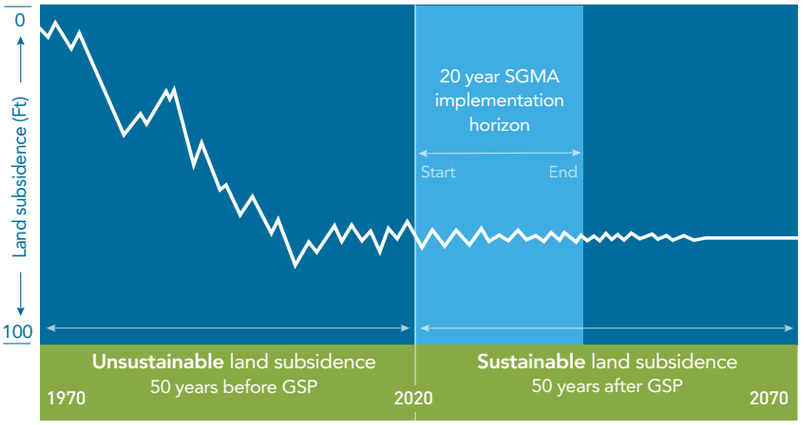
What might I be asked to do?

- Coordinate with my neighbors and my Groundwater Sustainability Agency (GSA) in developing a GSP that stabilizes land subsidence
- Adjust or reduce groundwater pumping in areas susceptible to land subsidence
- Participate in funding projects to reduce subsidence or repair and rehabilitate damaged infrastructure
- Allow monitoring endorsed by my GSA

IMPACT AFTER SUBSIDENCE



TRANSITION TO SUSTAINABLE LAND SUBSIDENCE



Historical land subsidence is unsustainable and shows a downward negative trend over time. SGMA compliance requires that over the 20 year implementation period, land subsidence reaches sustainable levels as determined by your GSA.

Be involved in your local GSA

SGMA encourages local landowners to work together to develop effective GSPs, and encourages neighboring basins to find common, acceptable solutions. Basins that fail to take corrective action over time may have plans written and implemented by the State Water Resources Control Board.

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