

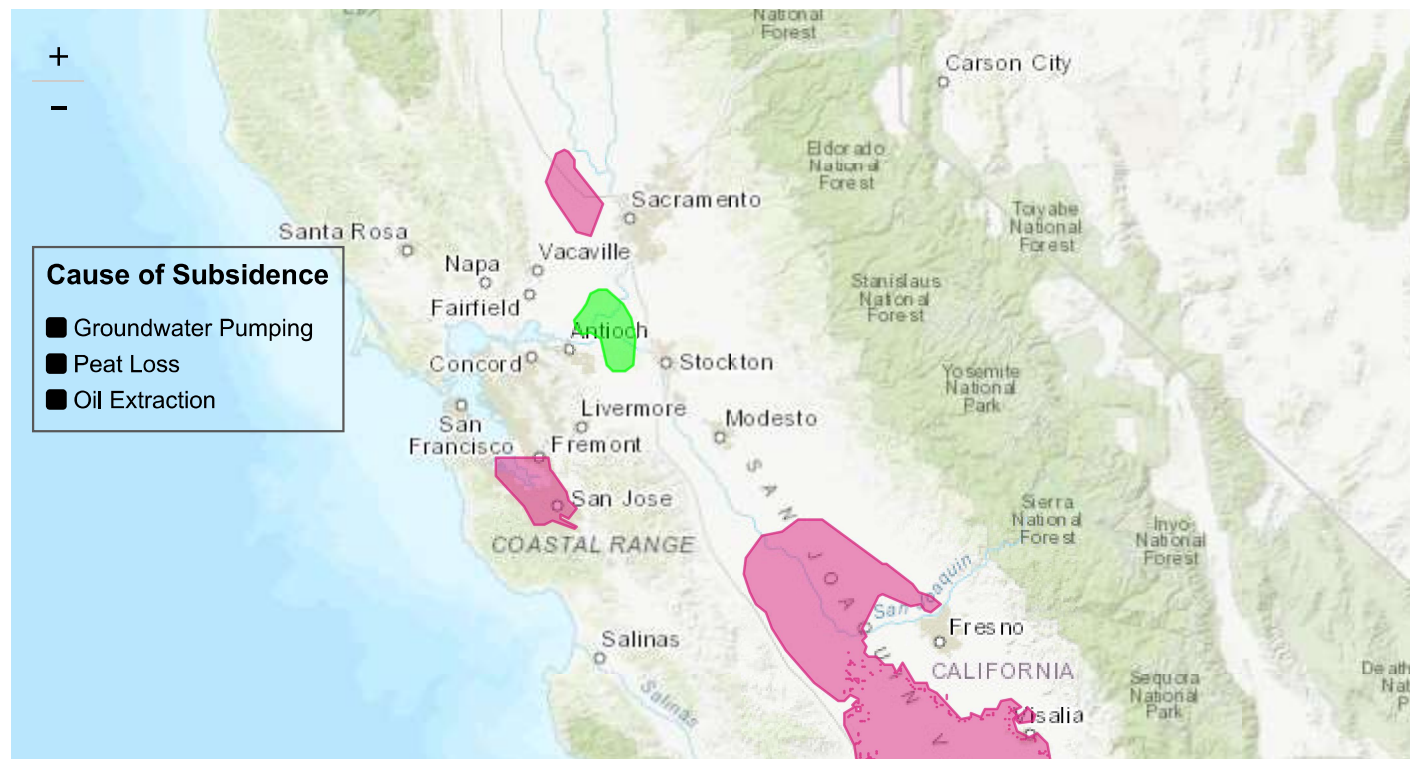
(<https://www.usgs.gov/>)

Search

Land Subsidence in California (<https://www.usgs.gov/centers/ca-water-ls/>)

Areas of Land Subsidence in California

In California, large areas of land subsidence were first documented by USGS scientists in the first half of the 20th century. Most of this subsidence was a result of excessive groundwater pumping. Completion of California's State and Federal water projects that bring water from California's wet north to its dry south allowed some groundwater aquifers to recover, and subsidence decreased in these areas. However, subsidence continues today, sometimes at nearly historically high rates of more than 1 foot/year (ft/yr) (</projects/central-valley/land-subsidence-san-joaquin-valley.html>). The map below illustrates areas of recorded subsidence—historical and current—across California.



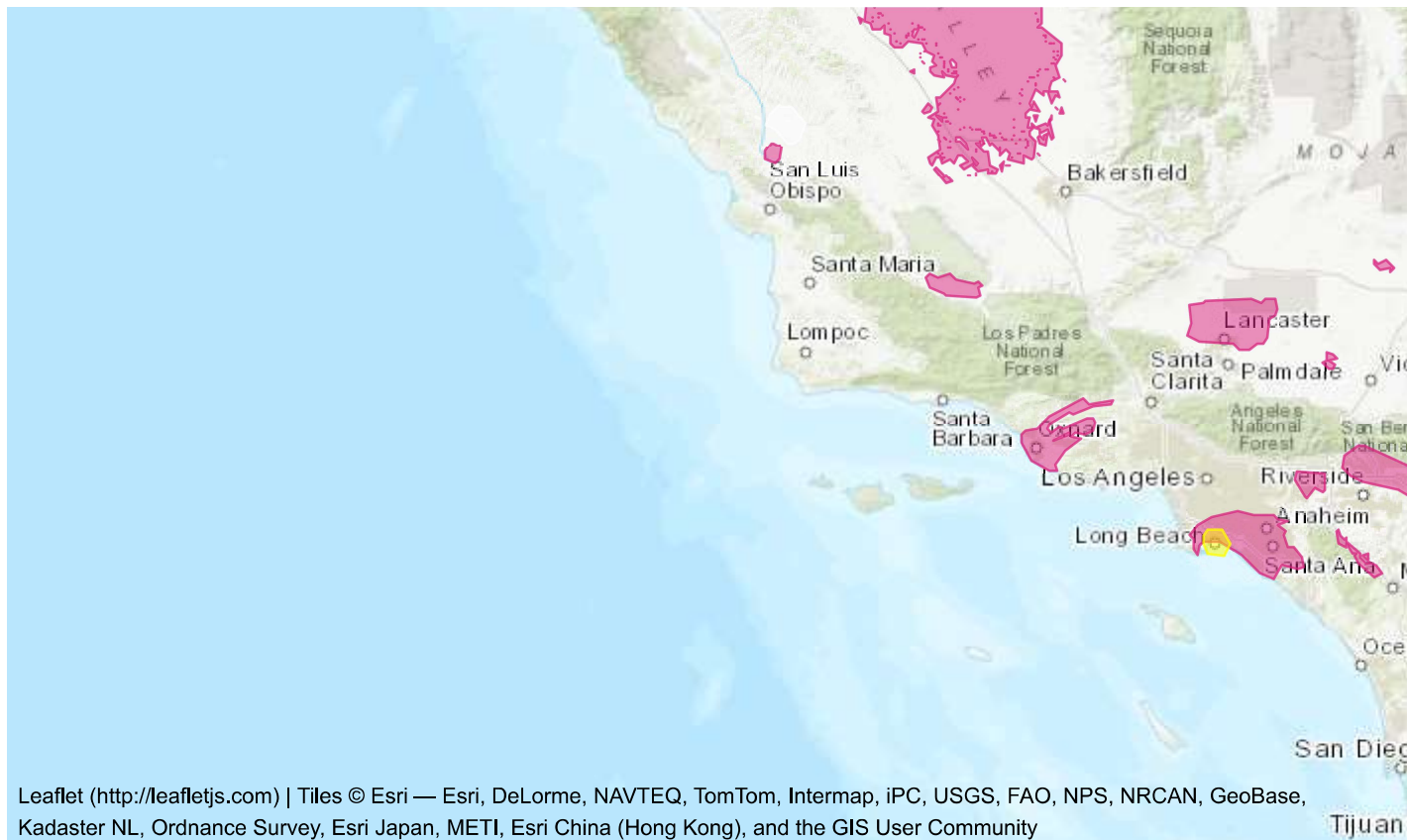
Groundwater Sustainability Indicators

Groundwater-Level Declines (</sustainable-groundwater-management/groundwater-levels-california.html>)

Groundwater-Storage Reductions (</sustainable-groundwater-management/groundwater-storage-california.html>)

Seawater Intrusion (</sustainable-groundwater-management/seawater-intrusion-california.html>)

Water-Quality Degradation (</sustainable->



[groundwater-management/water-quality-california.html](#)

[Land Subsidence \(/sustainable-groundwater-management/land-subsidence-california.html\)](#)

[Interconnected Surface-Water Depletions \(/sustainable-groundwater-management/interconnected-surface-water-depletion.html\)](#)

Subsidence Studies

[San Joaquin Valley \(/projects/central-valley/land-subsidence-san-joaquin-valley.html\)](#)

[Coachella Valley \(coachella-valley-subsidence.html\)](#)

[Mojave Desert \(/mojave/subsidence.html\)](#)

[Sacramento-San Joaquin Delta \(bay-delta-](#)

[subsidence.html](#))

Santa Clara Valley
([santa-clara-valley-
subsidence.html](#))

Data Downloads

Subsidence:
Interferometric
Synthetic Aperture
Radar (InSAR) ([central-
valley_insar-
timeseries.xlsx](#))

Subsidence:
Continuous GPS
(CGPS)
(<http://www.unavco.org/instrumentation/networks/status/pbo>)

Compaction:
Extensometers
([central-
valley_extensometer-
data.xlsx](#))

Benchmark Sites
([http://www.restoresjr.net/monitoring-
data/subsidence-
monitoring/](http://www.restoresjr.net/monitoring-
data/subsidence-
monitoring/))

Groundwater Levels
(<http://nwis.waterdata.usgs.gov/ca/nwis/gwlevels>)

Popular Publications

Glossary of selected
terms useful in
studies of the
mechanics of aquifer
systems and land
subsidence due to
fluid withdrawal
(<http://pubs.usgs.gov/wsp/2025/report.pdf>)
USGS Water Supply
Paper 2025

Groundwater
Availability of the
Central Valley Aquifer,
California
(<https://pubs.er.usgs.gov/publication/pp1766>)
USGS Professional
Paper 1766

Guidebook to studies
of land subsidence
due to ground-water
withdrawal
(<http://wwwrcamnl.wr.usgs.gov/rgws/Unesco/>)
Prepared for the
International
Hydrological
Programme, Working
Group 8.4

Land Subsidence
along the Delta-
Mendota Canal in the
northern part of the
San Joaquin Valley,
California, 2003-10
(<http://pubs.usgs.gov/sir/2013/5142/>)

USGS Scientific
Investigations Report
2013-5142

Land Subsidence from
Groundwater Use in
California (land-
subsidence-
groundwater-use-
california.pdf)
Report of Findings,
2014

Land subsidence in
the San Joaquin
Valley, California, USA,
2007-2014
([http://www.proc-
iahs.net/372/23/2015/piahs-
372-23-2015.html](http://www.proc-iahs.net/372/23/2015/piahs-372-23-2015.html))
Proceedings of the
International
Association of
Hydrological Sciences

Land Subsidence in
the United States
(<http://pubs.usgs.gov/circ/circ1182/>)
USGS Circular 1182

Land Subsidence in
the United States
(<http://water.usgs.gov/ogw/pubs/fs00165/SubsidenceFS.v7.PDF>)
USGS Fact Sheet-165-
00

Measuring Land
Subsidence from
Space

(<http://pubs.usgs.gov/fs/fs-051-00/pdf/fs-051-00.pdf>)
USGS Fact Sheet-051-00

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Contact USGS (<https://answers.usgs.gov/>)

U.S. Department of the Interior (<https://www.doi.gov/>)

DOI Inspector General (<https://www.doioig.gov/>)

White House (<https://www.whitehouse.gov/>)

No Fear Act (<https://www.doi.gov/pmb/eeo/reports-repository>)

FOIA (<https://www.usgs.gov/foia>)

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-  Instagram (<https://instagram.com/usgs>)