California and the Drought

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Purpose: To show how the current California drought has increased the effect of actions of humans in California in the recent Anthropocene and is currently shaping major geological aspects in a rapid time span.

http://www.ironman.com/triathlon/events/americas/ironman/lake-tahoe.aspx#axzz44XfZ0xAu

Other aspects:

Humans over mining of Ground water reservoirs

Humans Use of Fracking in the State and its effects

Damming rivers and lakes Biological effects

Overview of California's Water

About 60% of the precipitation in California comes from seasona
or snowfall in the Sierra Nevada and the southern Cascade Rang
Nevada Conservancy, 2011)

Most prominent bodies of water are used heavily for agriculture, energy, or domestic use.

The amount of surface water is not enough to support the large population of the state. So the rest of the needed water is taken from under ground water reservoirs or groundwater.

Use of ground water through the years

- Since the 1990's California's use of ground water has been steadily increasing.
- More than 40% total annual ground water used during the drought has gone to agriculture in the Sacramento and Central valleys
- Water has been pumped from California's Central Valley for more than 150 years, changing what used to be a marsh and extensive lake, Tulare Lake, into fertile agricultural fields.
- In that time, about 160 cubic kilometers (40 cubic miles) of water was removed--the capacity of Lake Tahoe--dropping the water table in some areas more than 120 meters (400 feet) and the ground surface 5 meters (16 feet) or more.

ttp://www.nature.com/news/water-and-climate-recognize-anthropogenic-drought-1.18220

Why is groundwater important?

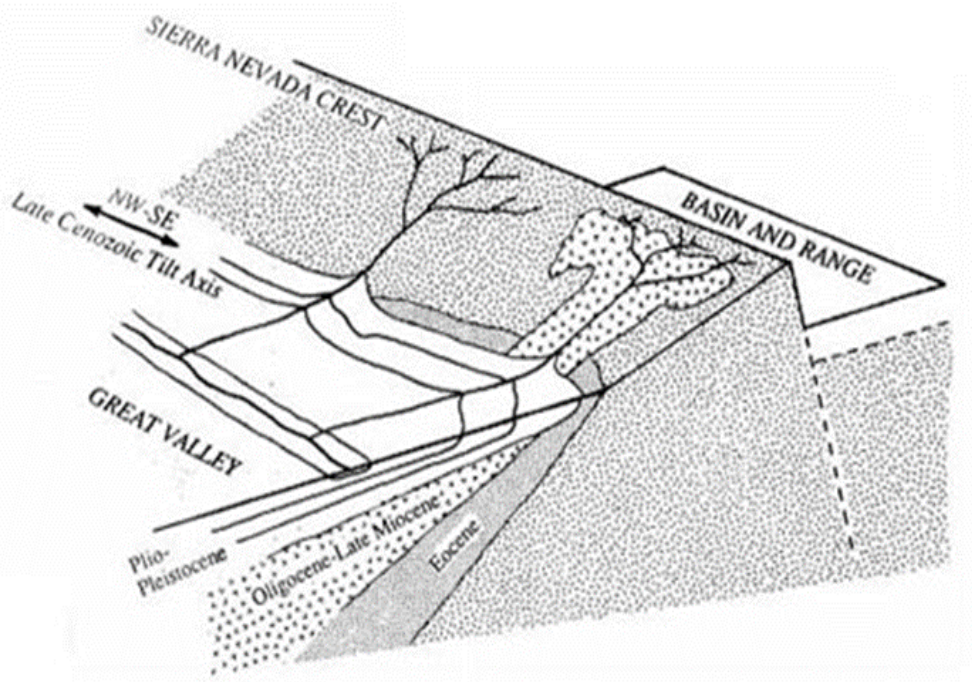
Groundwater is underneath the earth's crust and acts as a way to hold down the crust from popping up and rising.

This is called a "rebound".

Without reserves of groundwater the mountain range of the Sierra Nevada would rise by as much as 15 millimeters (.6 inches) in the pas 18 months

In the past 150 years the Sierras has risen about 6 inches.

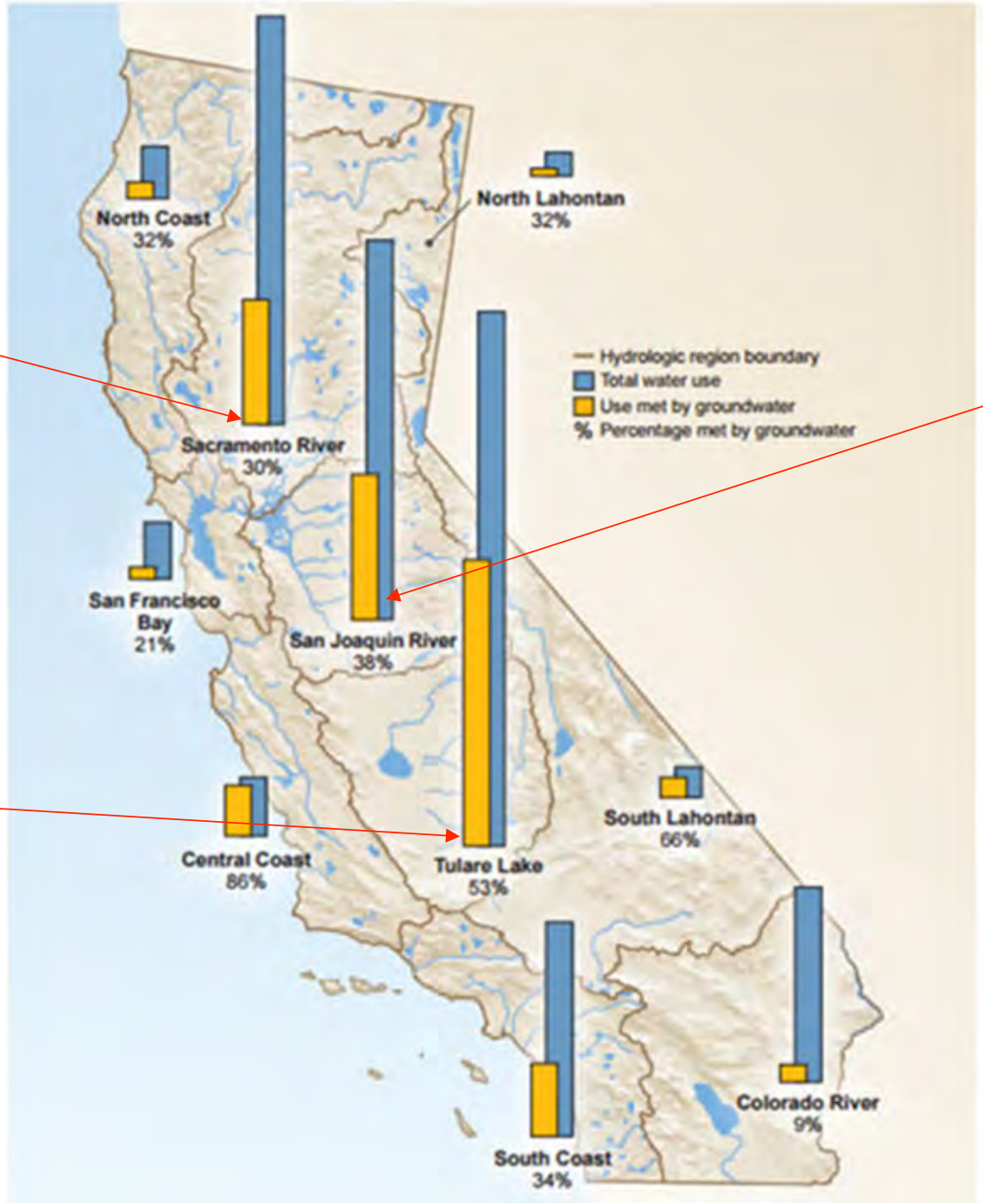
The Sierras are moving?



Due to the diminishing amount of groundwater reserves it allows the crust that makes up the mountain range to move

If continues to be unchecked in several dec could have a profound effect on the enviro in the sierras as well as the rest of Californi

Plant life could be effected.
Rivers coming from the Sierra Nevadas could drastically changed also effecting mountain ecosystems



Notice the most water con
is in the Valley regions.

ust how bad is the drought?

Folsom Lake

http://www.dailymail.co.uk/news/article-2567911/NASA-turns-research-California-drought.html

ake Mead

hich is in Nevada but provides much needed water to Southern California

http://voices.nationalgeographic.com/2014/07/30/groundwater-depletion-in-colorado-river-basin-adds-big-risks-to-water-security/

t also effects the Mountains as well

2015 Ski Season

2012 Ski Season

How do they get groundwater?

- They mine for it in a very similar way you would get oil out of the ground.
- This way of getting water causes mini stresses on the ground and various near by fault lines.
- These mini stresses could very easily according to several studies trigger a mini quake and even a larger earthquake.
- This has only become a concern due to the increase in need to get more ground water.

https://www.nsf.gov/news/news_summ.jsp?cntn_id=131393

Other aspects of Anthropocene due to Drought

- Fracking has also been proven to cause similar mini stresses on fault line but in a larger scale this is called Induced Seismicity.
- Induced Seismicity is when water is pumped into the ground which causes added pressure of injected water lubricates existing faults, which can separate them enough to release the energy that causes tremors.
- Fracking and groundwater extraction together could trigger a larger earth quake along a near fault line.

Humans effects on California water

California has the one of the most engineered and diversified water systems, including six aqueduct networks more than 2,000 kilometers long and in excess of 1,400 dams.

These damns and irrigation systems greatly impacts the migration cycle of local fish like salmon trout, and delta smelt

increased groundwater extraction lowers the base flows of rivers, streams and pools. Pool networks become disconnected and food webs are broken.

Intermittent streams, which provide rearing and breeding habitats for river biota, are especially vulnerable to drought.

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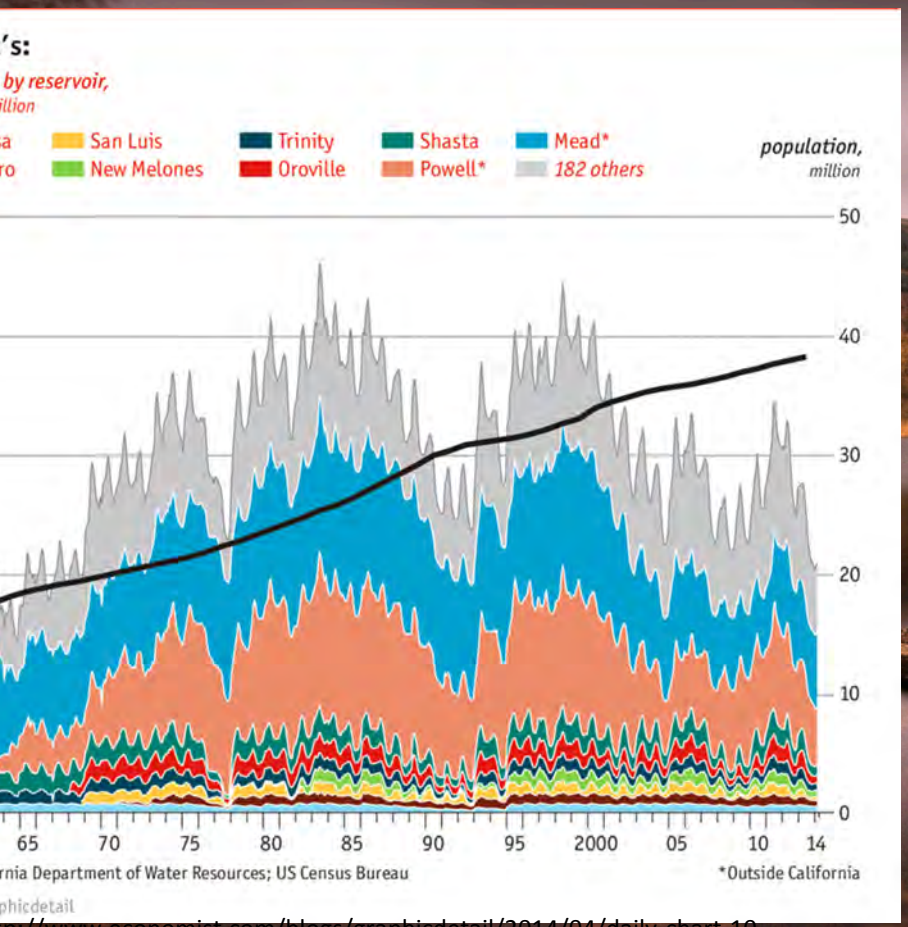
More pictures!!!



tp://www.economist.com/blogs/graphicdetail/2014/04/daily-chart-10

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