SCV GSA

JULY 2020

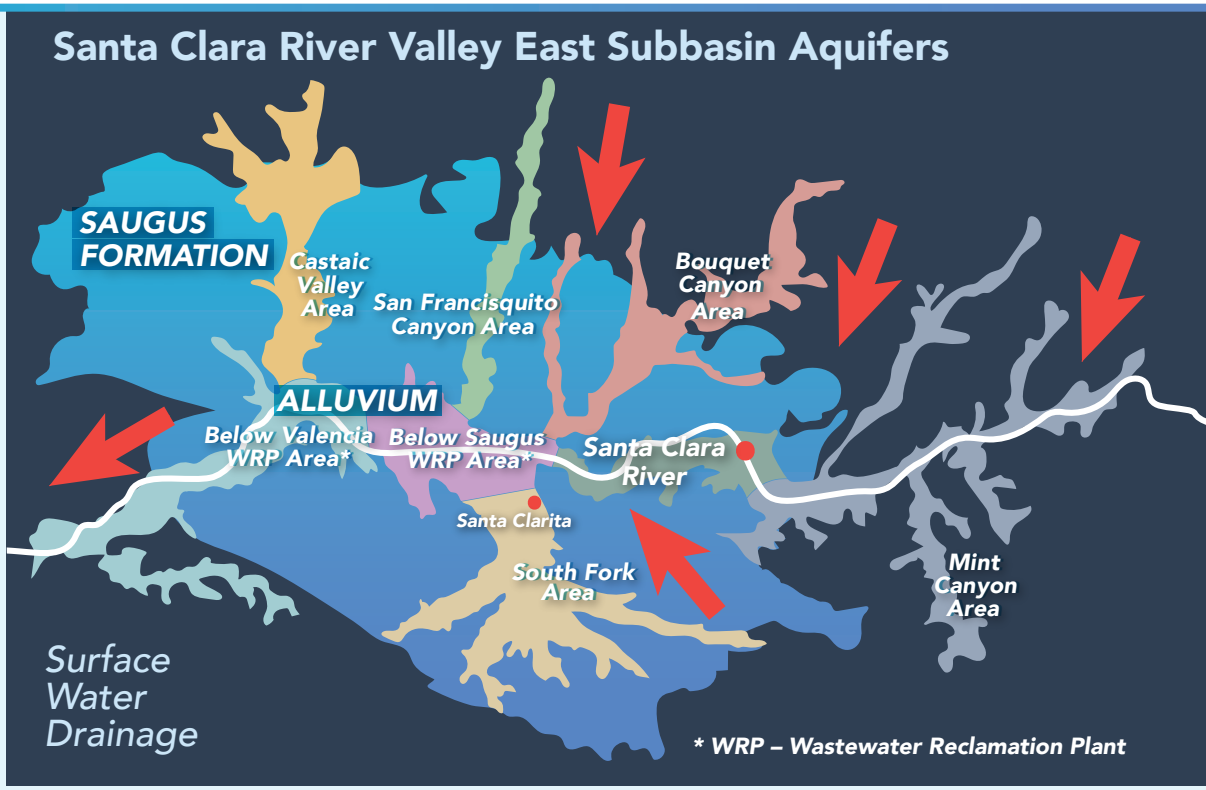
SANTA CLARA RIVER VALLEY EAST GROUNDWATER SUBBASIN

THE CONNECTION BETWEEN GROUNDWATER & SURFACE WATER

A critical link exists between surface waters such as rivers, streams and lakes, and groundwater, which begins as precipitation and snowmelt in the mountains. Withdrawal of water from streams can deplete groundwater and pumping groundwater can deplete surface water sources. Effective water and land management depends on understanding this connection.

How surface water moves in the basin

Precipitation in the upper watershed percolates deep into the ground and becomes groundwater or flows in canyons and tributaries to the Santa Clara River. In urban areas, runoff follows storm drains to the river.



The Santa Clara River is the primary source of recharge for the aquifer. It is connected to the Alluvial Aquifer and has an indirect connection with the Saugus Formation in the western basin, where the Saugus Formation discharges its water into the Alluvial Aquifer and provides an upward driving force for groundwater to discharge into the Santa Clara River.

Barriers to groundwater recharge by surface water

Development next to waterways

Concrete-lined flood channels

Invasive species

SCV GSA

SANTA CLARA RIVER VALLEY EAST GROUNDWATER SUBBASIN

THE CONNECTION BETWEEN GROUNDWATER & SURFACE WATER

Assessing the role of weather and treatment plant discharges on river flow and groundwater levels

To develop a groundwater sustainability plan (GSP) for the Santa Clara River Valley East Groundwater Subbasin, the Santa Clarita Valley Groundwater Sustainability Agency is studying these points:

What is the relationship between alluvial groundwater levels and surface water flows in the Santa Clara River downstream of the Saugus and Valencia Water Reclamation Plants (WRPs)?

To what extent do discharges from the WRPs affect groundwater levels downstream, compared to other factors?

How is the river gaining (groundwater discharging into the river) or losing (surface water infiltrating to groundwater) during different climatic conditions?

The information will help assess the degree to which groundwater is supporting riparian habitat.

Methodology

The study area is the reach of the Santa Clara River west of the Saugus WRP to the Piru Dry Gap, about 3 miles west of the Los Angeles/Ventura county line. The area was selected because it contains the portion of the basin where there are exchanges between surface water and groundwater and because there are sensitive habitats in this section of the river. Hydrographs were developed using historic precipitation records, river elevation data, discharges from the water reclamation plants, Castaic Lagoon releases and depth to water in various alluvial wells.

Conclusions

- Surface water flow rates in the Santa Clara River are influenced by both rainfall and treated discharge from the Saugus and Valencia WRPs.
- Groundwater elevations in the alluvium along the Santa Clara River appear to be influenced by precipitation east of the mouth of Castaic Creek; the area to the west is controlled by groundwater discharge to the alluvium (and hence the river) from the underlying Saugus Formation.
- WRP discharges have a significant influence on groundwater levels and surface water flow as far downstream as the Piru Dry Gap, providing a continued source of recharge to the Alluvial Aquifer, even during drought periods.
- It is believed that WRP discharges, along with precipitation and Castaic Reservoir releases, are an important component affecting groundwater levels and river flow.
- Regardless of WRP discharges, long-term trends in precipitation strongly dictate whether certain reaches of the Santa Clara River are gaining or losing. During periods of substantially above-average precipitation, the majority of the channel in the study area appears to be gaining because the Alluvial Aquifer is relatively full. During years of prolonged drought, the data indicate that most of the channel is likely losing, except possibly in Reach 4 where the Saugus is discharging to the alluvium.
- When there is limited recharge from rainfall and stormwater flows upstream to the east, the Alluvial Aquifer continually drains to the west and water levels in the alluvium on the east end of the basin decline substantially. This has resulted in decreased well yields in this area and some wells are shut down.
- Since the last drought ended in 2016, groundwater elevations have rebounded in most wells.