

Description of the boundaries of the alluvial aquifers that form the Fillmore and Piru Subbasins

The Fillmore and Piru subbasins are two of the series of alluvial groundwater basins located along the Santa Clara River Valley in Ventura County, California. They lie within the Santa Clara River Watershed and fully within Ventura County. The connected subbasins are part of the larger groundwater system of the Santa Clara River valley. Clay layers have been identified at some locations within the Piru subbasin but are not thought to be continuous. Both the Fillmore and Piru subbasins are considered to be unconfined groundwater subbasins.

Piru Subbasin

The eastern boundary of the Piru subbasin is located near the Ventura/Los Angeles County Line. In this vicinity the alluvium is thin and underlain by non-water-bearing rocks. Alluvium along lower Piru Creek, Hopper Creek, Holser Canyon, and lower Tapo Canyon are included within the mapping of the subbasin.

The downstream boundary with the Fillmore basin is transitional. In this area of the “Piru Narrows” the alluvium of the valley floor is about one-mile wide, extending two miles upstream of the Fillmore Fish Hatchery. This constriction in the valley commonly has a gaining stream reach and is easily recognized by wet channel conditions and abundant riparian vegetation. The upstream extent of the gaining reach varies with groundwater elevations in the western portion of the Piru basin. Surface water flow is greatest in the vicinity of the Fillmore Fish Hatchery. West of this location depth-to-groundwater becomes greater and surface flow commonly diminishes as surface water percolates as recharge to the Fillmore basin.

The current DWR-mapped western boundary of the Piru subbasin is located near the midpoint of the Piru Narrows (approximately one mile upstream of the Fillmore Fish Hatchery and approximately two miles upstream of the eastern boundaries of the City of Fillmore). The Fillmore-Piru Basins GSA proposes that the basin boundary be moved west to the vicinity of the Fillmore Fish Hatchery where the greatest constriction of groundwater flow is evidenced by rising groundwater. United Water Conservation District, the County of Ventura and the U.S. Geological Survey has mapped the basin boundary here for decades.

The Piru subbasin consists of recent and older alluvium underlain by the Pleistocene San Pedro formation. The recent and older alluvium exists almost subbasin-wide and is made up primarily of coarse sand and gravel. The recent alluvium ranges in thickness from approximately 20 feet near Blue Cut at the east end of the subbasin to 60-80 feet in the remainder of the subbasin. The older alluvium occurs as terrace deposits and as a layer of variable thickness (up to 80 feet) under the recent alluvium (Mann, 1959). Alluvial material is included as basin material to effectively extend the proposed basin boundaries beyond the existing DWR boundaries in a number of locations. The mapped extent of certain alluvial stringers is truncated at breaks in slope, mapped structural features, or at

points where the limited mapped width suggests alluvium will be less than 25 feet thick, unsaturated, or both. Areas upslope of these alluvial features generally include shales and other fine-grained materials, suggesting these alluvial stringers are not likely to yield significant quantities of water. Landslide deposits are generally not mapped as basin material.

The San Pedro Formation is folded into a syncline with an east-west oriented axis and underlies the older alluvium, except at the east end of the subbasin where the older alluvium is underlain by impermeable Pico formation. The San Pedro formation consists primarily of permeable sand and gravel and can extend to a depth of approximately 8,800 feet, as interpreted from oil well electrical logs (Mann, 1959). The depth from which groundwater production is suitable for agricultural and urban use and can be reasonably extracted is however considerably shallower than 8,800 feet. Few water wells deeper than 700 feet exist in the Piru subbasin.

Three principal faults bound the Piru subbasin: the Oak Ridge fault to the south, and the San Cayetano and Camulos faults to the north.

Fillmore Subbasin

The Fillmore subbasin is contiguous with and lies west (down-gradient) of the Piru subbasin. The subbasin extends northward to include the Pole Creek fan and the greater floodplain of Sespe Creek, extending approximately four miles north of Highway 126. The northern portion of the Fillmore subbasin located west of Sespe Creek is called the Sespe Upland. The Sespe Upland is characterized by steep south-sloping alluvial fan material, including complex terrace deposits, older alluvial fan deposits and recent alluvial fan deposits, which unconformably overlie the Pleistocene San Pedro formation (Mann, 1959). Alluvium fill in Timber Canyon is included as part of the subbasin.

The boundary between the Fillmore basin and the down-gradient Santa Paula basin is placed at a geologic constriction in the Santa Clara River Valley just upstream of Santa Paula Creek, which enters from the north. Near Willard Road, there exists a reach of the Santa Clara River that displays perennial rising groundwater (gaining stream conditions) even in dry years. The length of the gaining stream reach is greatest when water levels are high in the Fillmore basin and decreases as groundwater levels fall. DWR maps the basin boundary at Willard Road. West of this vicinity groundwater gradients steepen slightly as the valley widens in the Santa Paula basin.

The boundary of Santa Paula basin was defined when the basin was adjudicated in 1996. The boundary was placed slightly west of the DWR boundary, aligned with the channel of Haun Creek and at the location where the valley of the Santa Clara River is narrowest. This was a stipulated judgment, where local water users and resource managers agreed on the appropriateness of the basin boundaries and the allocation of pumping. United has historically gaged surface water flows at the adjudication boundary, a site where channel conditions are favorable for gaging and surface

flow discharge from the Fillmore basin is thought to be near its maximum. United uses the court-defined basin boundaries to define the Fillmore-Santa Paula basin boundary. Ventura County has historically mapped the boundary farther west, closer to the channel of Santa Paula Creek.

The Fillmore-Piru Basins GSA proposes that the DWR basin boundary be moved west to align with the boundary of the adjudicated Santa Paula basin. The adjudication boundary is located near the area of greatest geologic constriction and near the area of greatest streamflow due to rising water. Depths to groundwater increase down-gradient (west) of this existing basin boundary.

The Pole Creek Fan is located between Sespe Creek and the Santa Clara River, forming the northeastern portion of the subbasin and underlying much of the City of Fillmore. This area is primarily composed of alluvial fan material.

The area of the Fillmore subbasin located south of the Santa Clara River is covered by recent sand and gravel deposits from the Santa Clara River and Sespe Creek. The recent sand and gravel of the Santa Clara River near the Fillmore Fish Hatchery at the eastern boundary of the subbasin extend to a depth of about 60 feet and the older alluvial materials extend from depths of approximately 60 to 100 feet. In the Bardsdale area, the combined thickness of this alluvial fill is as much as 120 feet (Mann, 1959). At the western subbasin boundary near Willard Road, the recent alluvium is approximately 80 feet thick. West of the City of Fillmore, the recent alluvium of Sespe Creek is approximately 80 feet thick. The recent sand and gravel deposits associated with Sespe Creek and the Santa Clara River are extremely permeable. Alluvial material is mapped to effectively extend the proposed basin boundaries beyond the existing DWR boundaries in a number of locations. The mapped extent of certain alluvial stringers is truncated at breaks in slope, mapped structural features, or at points where the limited mapped width suggests alluvium will be less than 25 feet thick, unsaturated, or both. Areas upslope of these alluvial features generally include shales and other fine-grained materials, suggesting these alluvial stringers are not likely to yield significant quantities of water. Landslide deposits are generally not mapped as basin material.

The San Pedro formation underlies most of the Fillmore subbasin and is folded into a syncline with an east-west oriented axis. Along the main axis of the syncline near the center of the subbasin, the San Pedro formation reaches a depth of 8,430 feet (Mann, 1959). The depth from which groundwater production is suitable for agricultural and urban use and can be reasonably extracted is considerably shallower than 8,430 feet. Few wells in the subbasin are deeper than 800 feet in the Fillmore subbasin. At the western subbasin boundary, the San Pedro formation extends to a depth of 5,000 to 6,000 feet.

The two principle faults that bound the Fillmore subbasin are the Oak Ridge fault to the south and the San Cayetano fault to the northeast. Several other faults bound the subbasin on the northwest side.

The mapping, aquifer descriptions and technical arguments for basin boundary adjustments contained in this proposal are the work of Tim Moore and Dan Detmer of United Water Conservation District, who have worked extensively in the Piru, Fillmore and Santa Paula basins. Tim Moore is a Professional Geologist and Certified Hydrogeologist in the State of CA (PG #9268, HG #1027).

A handwritten signature in blue ink that reads "Dan Detmer". The signature is stylized, with the first name "Dan" and last name "Detmer" written in a cursive-like script.

Dan Detmer, Supervising Hydrogeologist
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PG #7440, HG #806

Reference: Mann, 1959, John F. Mann Jr. & Associates, A plan for groundwater management for United Water Conservation District, 116-124p.