Redding Groundwater Basin, South Battle Creek Subbasin

- Groundwater Basin Number: 5-6.06
- County: Tehama
- Surface Area: 32,300 acres (50 square miles)

Basin Boundaries and Hydrology

The South Battle Creek Subbasin comprises the portion of the Redding Groundwater Basin bounded to the west by the Sacramento River, to the north by Battle Creek, to the east by the Cascade Range, and to the south by the drainage divide along the north rim of Paynes Creek. Annual precipitation within the subbasin ranges from 25- to 29-inches, increasing to the east.

Hydrogeologic Information

Water-Bearing Formations

The South Battle Creek aquifer system is comprised of continental deposits of late Tertiary to Quaternary age. The Quaternary deposits include younger alluvium and the Pleistocene Modesto Formation. The Tertiary deposits include the Tuscan Formation and possibly the Tehama Formation along the Sacramento River. The Tuscan Formation is the primary water-bearing unit in the subbasin. Helly and Harwood (1985) reports that the Tehama Formation interfingers with the Tuscan Formation in the region between Interstate Highway 5 and the Sacramento River north of the city of Red Bluff. The Tehama Formation may extend beyond the Sacramento River within the subbasin boundary; however, the deposit is not included here as a water-bearing formation. The following descriptions are from Helley and Harwood (1985) unless noted otherwise.

Holocene Alluvium. The alluvium consists of unconsolidated gravel, sand, silt and clay from stream channel and floodplain deposits. These deposits are found along the Sacramento River. The thickness ranges up to 30 feet. This unit represents the perched water table and the upper part of the unconfined zone of the aquifer. Although the alluvium is moderately permeable it is not a significant contributor to groundwater usage due to its geomorphic distribution.

Pleistocene Modesto Formation. The Modesto Formation consists of terrace deposits containing poorly consolidated gravel with some sand and silt. These deposits are found along Inks Creek, Battle Creek and the Sacramento River. The thickness varies up to 50 feet. The sediments are moderately to highly permeable and yield limited domestic water supplies.

Pliocene Tuscan Formation. The Tuscan Formation is composed of a series of volcanic mudflows, tuff breccia, tuffaceous sandstone and volcanic ash layers and is the principal water-bearing formation in the subbasin. Generally, the formation is described as four separate but lithologically similar units, Units A through D (with Unit A being the oldest), which in some areas are separated by layers of thin tuff or ash units.

Unit A is the oldest water bearing unit of the formation and is characterized by the presence of metamorphic clasts within interbedded lahars, volcanic conglomerate, volcanic sandstone and siltstone.

Unit B is composed of a fairly equal distribution of lahars, tuffaceous sandstone, and conglomerate. Coarse cobble to boulder conglomerate predominates in the eastern and northern parts of mapped unit. This portion of the formation is approximately 430 feet thick.

Unit C is the primary surfacial deposit in the subbasin and consists of several massive mudflow or lahar deposits with some interbedded volcanic conglomerate and sandstone. The thickness of Unit C exposed in the vicinity of Tuscan Springs and Tuscan Buttes ranges from 165- to 265-feet.

Unit D consists of fragmental deposits characterized by large monolithologic masses of andesite, pumice, and fragments of black obsidian in a mudstone matrix. The deposit varies in thickness from 30- to 160-feet.

The total thickness of the Tuscan Formation ranges from approximately 750 feet in the northeastern extents of the subbasin to 2,400 feet at the Sacramento River (DWR 1964).

Restrictive Structures

The Inks Creek fold system, a northeast to southwest trending anticlinal structure, is part of the hydrogeologic divide between the Redding Groundwater Basin and the Sacramento Valley Groundwater Basin.

Recharge Areas

Recharge to the principal aquifer is mostly by infiltration of streamflows at the basin margins and from Inks Creek at the center of the basin. Infiltration of applied water, streamflows, and precipitation are the main sources of recharge into the alluvium (Pierce 1983).

Groundwater Level Trends

Data is not available.

Groundwater Storage

Groundwater Storage Capacity. The storage capacity for the entire Redding Basin is estimated to be 5.5 million acre-feet for 200 feet of saturated thickness over an area of approximately 510 square miles (Pierce 1983). Specific yield data for the South Battle Creek Subbasin aquifer system is not available to estimate storage capacity at the subbasin level.

Groundwater Budget (Type B)

Estimates of groundwater extraction are based on surveys conducted by the California Department of Water Resources during 1994 and 1995. Surveys included land use and sources of water. Estimates of groundwater extraction for agricultural and municipal/industrial uses are 1,300 and 310 acre-feet respectively. Deep percolation of applied water is estimated to be 860 acre-feet.

Groundwater Quality

Characterization. Groundwater in the subbasin is typed as bicarbonate water with mixed cationic character. The concentration of total dissolved solids is approximately 360 mg/L (DWR unpublished data). There are no known groundwater impairments.

Well Characteristics

	Well yields (gal/min)	
Irrigation	No known data	
	Total depths (ft)	
Domestic	Range: 80 – 884	Average: 189 (18 Well Completion Reports)
Irrigation	Range: 170 – 270	Average: 227 (5 Well Completion Reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
	Groundwater levels	0
	Miscellaneous Water Quality	0

Basin Management

Groundwater management:	Tehama County adopted a countywide AB 3030 groundwater management plan in 1996. Tehama County adopted a groundwater management ordinance in 1994.
Water agencies	
Public	Tehama County Flood Control and Water Conservation District.
Private	

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Errata

Changes made to the basin description will be noted here.