

## Santa Rosa Valley, Healdsburg Area Subbasin

- Groundwater Basin Number: 1-55.02
- County: Sonoma
- Surface Area: 15,400 acres (24 square miles)

### Basin Boundaries and Hydrology

The Healdsburg Area subbasin includes the floodplain of the Russian River. To the north it is bounded by the confluence of School House Creek and Dry Creek, and to the south by Lafayette School and the U.S. Government Reservation (Healdsburg). The boundaries are generally defined by alluvium and river channel deposits (DWR 1983). Precipitation in the Healdsburg area subbasin ranges from about 36 inches in the south to about 44 inches in the north (USDA 1999).

### Hydrogeologic Information

#### ***Water Bearing Formations***

The principal water source in the Healdsburg area is alluvium, with secondary sources being the Glen Ellen Formation, alluvial fan and terrace deposits, and the Merced Formation in the south. The Sonoma Volcanics contribute a very limited amount of water (DWR 1983).

**Quaternary Alluvium.** Holocene-age Alluvium and River Channel deposits underlie the Russian River, Dry Creek, and other tributaries. The deposits are unconsolidated, permeable gravel and sand. Increasing amounts of silt and poorer sorting away from the river causes lower permeability. Alluvium produces high yields, and provides most of the groundwater supply to the City of Healdsburg. The specific yield is high -- between 8 to 20 percent -- and near the river 25 to 50 foot wells can yield 200 to 500 gpm (DWR 1983).

**Terrace Deposits.** Terrace deposits, Pleistocene in age, outcrop discontinuously along the Russian River and Dry Creek. The deposits are unconsolidated, cross-bedded sands with some silt and clay, with a thickness of up to 200 feet. These were originally alluvial fan, floodplain and stream deposits until the streams downgraded and left the terraces exposed. Yields from the Terrace Deposits are adequate for domestic use, stock watering, commercial, and limited industrial use. Yields range from 10 to 50 gpm, higher where the terraces are less dissected, and the specific yield is moderate (8 to 15 percent). The specific capacity is about 5 gpm/ft (DWR 1983).

**Glen Ellen Formation.** The Glen Ellen consists of partially cemented beds and lenses of poorly sorted gravel, sand, silt, and clay that vary widely in thickness and extent (Cardwell 1958; DWR 1983). This continental, alluvial fan and floodplain deposit is Pliocene (?) to Pleistocene age, and is about 1,500 feet thick east of the Russian River and along the east side of Dry Creek (DWR 1983). Water yield is highly variable because the unit is very heterogeneous, but permeability is generally low (DWR 1983). Average specific yield for the Glen Ellen Formation is 3 to 7 percent (DWR 1982;

DWR 1983). It is tapped for domestic use, and wells yield from 1 to 140 gpm, with a specific capacity of about 2 gpm/ft (DWR 1983).

**Merced Formation.** The Merced Formation occurs only in the extreme southern part of the basin. It is a marine deposit of fine sand and sandstone, but has thin interbeds of clay and silty clay, some lenses of gravel, and localized fossils (Cardwell 1958). It is Pliocene in age, and its thickness is estimated from 300 to greater than 1,500 feet. Further south in the Santa Rosa Plain, the Merced Formation is a major producer, but in the Healdsburg Area yields are only small to moderate (8 to 15 percent) with local exceptions (DWR 1983).

### ***Groundwater Level Trends***

DWR measures groundwater levels in eight (8) wells in the Healdsburg area. Data from the last 10 years show that the groundwater level has remained relatively constant, although one well (09N10W12C01M) that has been measured since 1965 shows a gradual decrease in the water table, from 110 to 100 ft above sea level (DWR unpublished data).

### ***Groundwater Storage***

**Groundwater Storage Capacity.** The groundwater storage capacity has been estimated at 489,000 af (DWR 1983). This estimate is based on a TRANSCAP calculation for an area slightly larger than the one defined by this bulletin (includes parts of Santa Rosa Plain).

**Groundwater in Storage.** The estimated total volume of groundwater in storage for the year 1980 was 390,000 af (DWR 1983). This estimate is based on a TRANSCAP calculation for an area slightly larger than the one defined by this bulletin (includes parts of Santa Rosa Plain).

### ***Groundwater Budget (Type C)***

There is insufficient data available in order to provide a water budget for this sub basin.

### ***Groundwater Quality***

**Characterization.** The water in this area can be characterized as moderately hard to hard bicarbonate type and generally suitable for all uses (Cardwell 1965). TDS ranges from 90 to 500 mg/L but generally is less than 200 mg/L. EC ranges from 178 to 672  $\mu$ mhos/cm based on 16 wells from Alexander Valley and two wells from Healdsburg (DWR 1983).

**Impairments.** No major impairments identified (DWR 1983). In areas where wells tap the alluvial deposits, the quality of the river water may affect water in those wells. Water quality in both Dry Creek and the Russian River is considered good (DWR 1983; Cardwell 1965).

## Water Quality in Public Supply Wells

Constituent Group <sup>1</sup>	Number of wells sampled <sup>2</sup>	Number of wells with a concentration above an MCL <sup>3</sup>
Inorganics – Primary	25	0
Radiological	11	0
Nitrates	26	0
Pesticides	13	0
VOCs and SVOCs	14	0
Inorganics – Secondary	25	11

<sup>1</sup> A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).

<sup>2</sup> Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

<sup>3</sup> Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

## Well Characteristics

### Well yields (gal/min)

Alluvial wells near the river generally yield 200 to 500 gal/min  
Terrace deposit wells generally yield 10 to 50 gal/min  
Glen Ellen Formation wells yield 1 to 140 gal/min  
(Well-yield data obtained from Cardwell 1965)

### Total depths (ft)

Domestic	Range: 30 - 600	Average: 176 (based on 206 wells)
Municipal/Irrigation	Range: 32 - 673	Average: 141 (based on 58 wells)

## Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR (incl. Cooperators)	Groundwater levels	8 wells/semi-annually
Department of Health Services	Coliform, nitrates, mineral, organic chemicals, and radiological.	28 wells as required in Title 22, Calif. Code of Regulations

## Basin Management

Groundwater management:	No groundwater management plans were identified.
Water agencies	
Public	City of Healdsburg Public Works Department
Private	

## References Cited

- California Department of Water Resources. 1982. Evaluation of Ground Water Resources, Sonoma County. Volume 2: Santa Rosa Plain. Bulletin 118-4.
- \_\_\_\_\_. 1983. Evaluation of Ground Water Resources, Sonoma County. Volume 5: Alexander Valley and Healdsburg Area. Bulletin 118-4.
- Cardwell, G.T., 1958. Geology and Ground Water in the Santa Rosa and Petaluma Valley Areas, Sonoma County, California. USGS Water Supply Paper 1427.
- \_\_\_\_\_. 1965. Geology and Ground Water in Russian River Valley Areas and in Round, Laytonville and Little Lake Valleys, Sonoma and Mendocino Counties, California. USGS Water Supply Paper 1548.

## Errata

Changes made to the basin description will be noted here.