

Napa-Sonoma Valley Groundwater Basin, Napa-Sonoma Lowlands Subbasin

- Groundwater Basin Number: 2-2.03
- County: Napa, Solano
- Surface Area: 40,455 acres (63 square miles)

Basin Boundaries and Hydrology

The Napa-Sonoma Lowlands is a subbasin of the Napa-Sonoma Valley Groundwater Basin. The subbasin occupies a lowland area immediately north of San Pablo Bay. The subbasin is bounded to the north by the Mayacamas Mountains. The Sonoma and Napa valleys bound it to the northeast and northwest, respectively. The southern extent of the subbasin constitutes tidal marshlands lying at or below sea level. The marshlands merge with alluvial plains of the Napa and Sonoma valleys to the north. These marshlands are incised with numerous winding tidal channels containing brackish water (Kunkel and Upson 1960). The Napa River and several tributaries including Suscol, Carnernos, and Huichica creeks drain the subbasin. The annual precipitation ranges from 20 to 24 inches over most of the basin, but exceeds 24 inches at the northern margin.

Hydrogeologic Information

Information was not available for the following subsections:

Recharge Areas

Groundwater Level Trends

Groundwater Storage

Groundwater Budget (Type C)

Water-Bearing Formations

The primary water-bearing formations include Recent and Pleistocene Alluvium and the Pleistocene Huichica Formation (Kunkel and Upson 1960).

Recent Alluvium. The Recent Alluvium is of late Pleistocene to Recent age. It consists of interbedded deposits of unconsolidated gravel, sand, silt, clay, and peat. The Recent Alluvium underlies the channels, flood plain deposits, and salt marsh deposits north of San Pablo Bay. The Recent Alluvium overlies all other formations of the Napa-Sonoma Lowlands Subbasin. Limited well data indicate an alluvial thickness ranging from 50 to at least 120 feet. Generally unconfined, the Recent Alluvium yields water freely to wells where saturated; however, the thickness of the deposit may be insufficient for large well yields (Kunkel and Upson 1960).

Pleistocene Alluvium. The Pleistocene Alluvium consists of unconsolidated poorly sorted clay, silt, sand, and gravel. It generally overlies the Huichica Formation and underlies the Recent Alluvium. The Pleistocene Alluvium is composed of stream channel and alluvial fan deposits and has a maximum thickness of 500 feet. Groundwater in this formation exists under unconfined to semi-confined conditions. Lenses of gravel or clay and gravel yield moderate amounts of groundwater; however, wells yielding more than 50 gallons per minute are rare (Kunkel and Upson 1960).

Pleistocene Huichica Formation. The Huichica Formation is Pleistocene in age and composed of deformed continental beds consisting primarily of yellow silt, with some interbedded lenses of silt and gravel or silt and boulders. The Huichica Formation underlies the older and younger alluvium. The basal 200 to 300 feet are beds of reworked volcanic material (pumice and tuff, interbedded with coarse andesitic gravel or cobbles), silt, clay and lenses of coarse gravel and boulders. The total thickness of the Huichica Formation is at least 900 feet. Its permeability is low and generally yields insufficient water even for domestic needs (Kunkel and Upson 1960).

Groundwater Quality

Characterization. Groundwater within the unconfined alluvium is generally salty (having a chloride concentration greater than 250 ppm). Salinity seems to increase with increasing depth to at least 300 feet. Groundwater within the Huichica Formation is mostly soft and relatively high in bicarbonate. Groundwater is generally usable for most domestic and irrigation needs, but may be locally unsatisfactory. Irrigation wells completed to the immediate west and northwest of the subbasin (within the Sonoma Valley portion) yielded water of satisfactory quality when first drilled. Increased summer pumping caused an inflow of brackish water to the wells from the tidal sloughs, resulting in chloride concentrations above the acceptable limits for irrigation in some wells (Kunkel and Upson, 1960).

Well Characteristics

Well yields (gal/min)		
Municipal/Irrigation	Range: 0 – 600	Average: 39 (based on 61 well completion reports [WCRs])
Total depths (ft)		
Domestic	Range: 36 – 805	Average: 213 (based on 201 WCRs)
Municipal/Irrigation	Range: 200 – 800	Average: 387 (based on 87 WCRs)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR	Groundwater levels	None
County of Napa	Groundwater levels	3 wells/biannually
DWR	Miscellaneous water quality	5 wells/biennially
Department of Health Services and cooperators	Title 22 water quality	9 wells/annually

Basin Management

Groundwater management: No water management agency exists for this subbasin, but in Napa

	County a Groundwater Resources Advisory Committee was established in June 2011 and a County-wide Groundwater Monitoring Plan was published in January 2013.
Water agencies	
Public	City of Vallejo Public Works
Private	none

References Cited

Kunkel F, and Upson JE. 1960. Geology and Ground Water in the Napa and Sonoma Valleys, Napa and Sonoma Counties, California. US Geological Survey Water Supply Paper 1495.

Errata

Changes made to the basin description will be noted here.