

Fort Ross Terrace Groundwater Basin

- Groundwater Basin Number: 1-61
- County: Mendocino, Sonoma
- Surface Area: 8,500 acres (approx. 14 square miles)

Basin Boundaries and Hydrology

The Fort Ross Terrace Deposits consist of a series of discontinuous, uplifted marine terraces that lie along the northern California coastline within Mendocino and Sonoma Counties. This area of terrace deposits extends for approximately 54 miles along the coast from Point Arena on the north end to just north of Bodega Bay on the south end. They extend inland up to approximately 1.7 miles between Galloway Creek and Slick Rock Creek near Iversen Point. The Fort Ross Terrace Groundwater Basin is defined by the areal extent of these terrace deposits. North of Point Arena, the marine terrace deposits of similar age are designated as the Fort Bragg Terrace Area Groundwater Basin. The San Andreas Fault Zone trends northwest through the Point Arena area, which marks the approximate northern boundary of the Fort Ross Terrace Groundwater Basin (Jennings, 1977).

Three rivers transect the Fort Ross Terrace Area including (from north to south), the Garcia, Gualala, and Russian Rivers. Precipitation along the Fort Ross Terrace Area ranges from approximately 32 to 44 inches per year.

Hydrogeologic Information

Water Bearing Formations

Terrace Deposits form the highest yielding water-bearing formations in this area. The terrace deposits are underlain by bedrock of the Coastal Belt Franciscan Complex and Gualala Block. The Gualala Block bedrock formations include the Gualala Series, the Galloway and Schooner Gulch Formations, the Monterey Formation, and the Iversen Basalt. These two areas of bedrock are separated by the San Andreas Fault with the Franciscan Complex on the east side and Gualala Block on the west side. Bedrock units though considered “non-water bearing”, often yield enough water for domestic needs. Information on the bedrock formations, terrace deposits, and groundwater conditions was taken primarily from DWR (1982).

Terrace Deposits. Marine terrace deposits of Pleistocene age overlie wave-cut bedrock surfaces along the northern California coastline. They occur as a series of benches or steps, uplifted above sea level over the last half-million years. Up to five terrace levels have been identified. The marine terrace deposits are predominantly massive, semiconsolidated clay, silt, sand, and gravel, and range from 1 to about 80 feet in thickness with an average of about 23 feet. The deposits range from being clean sand, well-sorted, fine to coarse sand, to poorly sorted, fine to coarse sand with a silty matrix. Fine to medium gravel occurs as lag gravel layers and in lenses of conglomerate. Terrace composition varies and reflects the lithologies of the parent bedrock.

Terrace deposit wells in this area yield water from 2 to 75 gpm with an average yield of about 27 gpm. Since the terrace deposits cap the bedrock, the aquifer is generally unconfined. Estimated specific yield for this unit ranges from 5 to 22 percent with an average of 11.5 percent.

Groundwater Level Trends

No recent hydrographs are available in order to evaluate long-term water level trends. However, for the Mendocino County coastal area, it was concluded that the marine terrace deposits reach maximum storage by mid-January of each year under normal rainfall conditions (DWR 1982).

Groundwater Storage

Groundwater Storage Capacity. Storage capacity for the area of marine terrace deposits designated as the Point Arena Subunit, which extends from Mallo Pass Creek to Gualala, was estimated at 18,400 af (DWR 1982). This estimate is for a study area that includes a portion of the currently defined Fort Ross Terrace deposits from Point Area to Gualala, but also includes extensive terrace deposits north of Point Arena (Fort Bragg Terrace Area). Therefore, the above estimate does not accurately reflect the total storage for this defined groundwater basin. There are no published estimates of groundwater storage capacity for terrace deposits south of Gualala to Bodega Bay area.

Groundwater in Storage. No groundwater in storage estimates are available. However, it was concluded that under normal rainfall conditions, the terrace deposits reach maximum storage by mid-January of each year (DWR 1982).

Groundwater Budget (Type C)

There are insufficient data available in order to prepare a groundwater budget for this basin.

Groundwater Quality

Characterization. There are no published groundwater quality data for this basin, although it is reported that water quality is generally good within the Fort Bragg Terrace Area Groundwater Basin to the north. The Fort Bragg Terrace Area is the equivalent of the Fort Ross Terrace Area north of Point Arena. For comparison purposes, analysis of water samples collected from 15 wells in the Fort Bragg area indicated that sodium bicarbonate-chloride type water of good mineral quality was available from the terrace deposits (DWR 1968). Based on analyses of four water supply wells in the Fort Ross Terrace Area basin, TDS ranges from 230 to 380 mg/L and averages about 320 mg/L.

Impairments. Ferrous iron and sulfate occur sporadically within the Mendocino County Coastal study area (DWR 1982). Seawater intrusion is not a common problem in the study area, though it has occurred in localized areas near Point Arena and Iversen Point where wells drilled below sea level and near the ocean have reduced or reversed the seaward flow of fresh groundwater (DWR 1982). The terrace deposits between Alder Creek and Point Arena are susceptible to seawater intrusion (DWR 1982).

Water Quality in Public Supply Wells

Constituent Group ¹	Number of wells sampled ²	Number of wells with a concentration above an MCL ³
Inorganics – Primary	5	0
Radiological	4	0
Nitrates	7	0
Pesticides	4	0
VOCs and SVOCs	4	0
Inorganics – Secondary	5	3

¹ 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).

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

³ 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)

Terrace deposit wells yield water at rates ranging from approximately 2 to 75 gpm; average yield ranges from about 27 gpm; mean specific capacity is reported at 1.46 gpm/ft (DWR 1982).

Total depths (ft)

Domestic	Range: 16 – 400	Average: 163 (Based on 87 well completion reports)
Municipal/Irrigation	Range: 215 – 300	Average: 266 (Based on 5 well completion reports)

Active Monitoring Data

Agency	Parameter	Number of wells / measurement frequency
DWR and cooperators	Groundwater levels	None.
DWR and cooperators	Miscellaneous water quality	None.
Department of Health Services and cooperators	Title 22 water quality	13 wells / annually

Basin Management

Groundwater management: No groundwater management plans identified.

Water agencies

Public	Mendocino County W.A., Sonoma County W.A.
Private	

References Cited

- California Department of Water Resources (DWR) 1968. DWR Memorandum Report. Future Water Projects: Fort Bragg and Anderson Valley Areas - June.
- California Department of Water Resources (DWR) 1982. Mendocino County Coastal Ground Water Study. Northern District. June.
- Jennings, C.W., 1977. Geologic Map of California. Geologic Map Data Series Map No. 2. Scale 1:750,000. California Department of Conservation, Division of Mines and Geology.

Additional References

- California Department of Water Resources (DWR) 1958. Recommended Water Well Construction and Sealing Standards, Mendocino County. Bulletin No. 62 – November.
- California Department of Water Resources (DWR) 1965. Water Resources and Future Water Requirements – North Coastal Hydrographic Area, Volume 1: Southern Portion (Preliminary Edition) – Bulletin No. 142-1. April.
- California Department of Water Resources (DWR) 1975. California's Ground Water. Bulletin 118-75. September.

Errata

Changes made to the basin description will be noted here.