

Martis Valley Groundwater Basin

- Groundwater Basin Number: 6-67
- County: Nevada, Placer
- Surface Area: 35,600 acres (57 square miles)

Basin Boundaries and Hydrology

The Martis Valley Groundwater Basin is an intermontane, fault-bounded basin east of the Sierra Nevada crest. The Martis Valley is the principal topographic feature within the Basin, although the Basin extends to the north and west of the well-defined valley. The floor of Martis Valley is terraced with elevations between 5,700 and 5,900 feet above mean sea level. The valley is punctuated by round hills rising 1,000 feet or more around the valley perimeter. Mountains along the southern margin of Martis Valley rise dramatically to elevation in excess of 8,000 feet mean sea level. The basin boundaries are based on detailed field investigations developed by Hydro Search Inc. (1975).

The Truckee River crosses the basin from south to east in a shallow, incised channel. Principal tributaries to the Truckee River are Donner Creek, Martis Creek, and Prosser Creek. Major surface water storage reservoirs include Donner Lake, Martis Creak Lake, and Prosser Creek Reservoir. Average precipitation is estimated to be 23 inches in the lower elevations of the eastern portion of the basin to nearly 40 inches in the western areas.

Hydrogeologic Information

Water Bearing Formations

The following summary of water bearing formations is from Nimbus Engineers (2001).

Basement Rocks. Basement rocks include all rock units older than the basin-fill sediments and interlayered basin-fill volcanic units, specifically Cretaceous-Jurassic plutonic and metamorphic rocks and Miocene volcanic units. The plutonic/metamorphic rocks crop out east of the Basin and may underlie the Basin at depth. The Miocene volcanic units crop out adjacent to the basin and have been encountered in boreholes beneath the basin. The Miocene volcanic rocks have been referred to as the Kate Peak Formation and include lava, tuff breccia, and volcaniclastic deposits ranging from andesite to basalt in chemical composition. These basement rocks form the three dimensional boundaries of the basin. Basement rocks in the Truckee area typically contain, transmit, and yield relatively small quantities of groundwater.

Sedimentary deposits. Basin-fill sedimentary units include all sedimentary sequences deposited within the late Miocene-Pliocene Basin. These depositional sequences include interbedded sediments of stream and lake origin with laterally extensive, relatively impermeable, clay and silt layers materials of glacial origin and recent alluvial material. The basin-fill sedimentary units provide the greatest opportunity for storage and extraction of groundwater.

Volcanic deposits. Basin-fill volcanic units include basaltic andesite lava, tuff breccia and volcanoclastic deposits ranging in age between 0.75 and 7 million years. Basin-fill volcanic units underlying the Martis Valley and provide primary permeability in the interflow zones and within the interbedded volcanoclastics and secondary permeability from fractures and joints in the flows.

Structural Features. Structural features related to Basin and Range-style, normal faulting resulted in the formation of Martis Valley and the Martis Valley Groundwater Basin. Development of the Basin began in the late Miocene with the inception of faulting although most structural development occurred in the last five million years. Motion on many of these structures has continued to the present day.

Recharge Areas (optional)

Groundwater Level Trends

Water level elevations within the Martis Valley are strongly controlled by the complex stratification of the hydrogeologic units, topographic relief, and groundwater flow barriers. From 1990 through 2000, average basin groundwater levels remained relatively constant. Although, seasonal water level variations can exceed 10 feet.

Groundwater Storage

Groundwater Storage Capacity. In 1975 HSI, estimated the groundwater storage in the basin to be 1,000,000-acre feet. However, a recent study by Nimbus Engineers calculated the volume of the Basin materials to be 9,680,000 acre-feet. This volume was based on a smaller surface area of the deep basin and a greater basin thickness in the northern Martis Valley than used by HSI (1975). HSI used a surface area of the Basin of approximately 37,600 acres with an average depth of 400 feet and a specific yield of 0.07.

Groundwater in Storage. Nimbus Engineers (2001), calculated 484,000 acre-feet of groundwater in storage based on the total basin volume of 9,680,000 acre-feet and an unconfined storativity of 0.05. The value for storativity is a composite of values (Watson 1988) based on the wide variety of geologic materials encountered in the basin.

Groundwater Budget (Type A)

Nimbus developed a groundwater balance for the basin patterned after the work by HSI (1975). The water balance illustrates the relative distribution and movement of groundwater in the Basin and is considered to represent average annual conditions of precipitation and the best estimates of current groundwater inflow and outflow. Estimated inflows include natural recharge at 23,829 acre-feet and artificial recharge at 5,433 acre-feet. Estimated outflows include urban extraction at 7,062 acre-feet. Subsurface inflow and outflow were estimated to be 5,336 and 17,639 acre-feet, respectively. Nimbus Engineers has calculated 24,700 acre-feet per year of groundwater is available in the Martis Valley Groundwater Basin. The estimated average

annual recharge to the Martis Valley Groundwater Basin is 29,165 acre-feet/year (Nimbus Engineers 2001).

Groundwater Quality

Characterization. Water quality in the Truckee River and Martis Creek is considered good to excellent and capable of supporting a variety of beneficial uses. Groundwater quality will be effected by the Tahoe Truckee Sanitation Agency water reclamation plant expansion (CH2MHILL 1999).

Impairments. The Tahoe Truckee Sanitation Agency is expanding their Water Reclamation Plant. The plant is located in the Martis Valley groundwater basin. The draft environmental impact report by CH2MHILL (1999) explains the impacts on groundwater in detail.

Well Production characteristics

| Well yields (gal/min) | | |
|------------------------------|------------------|--|
| Municipal/Irrigation | Range: ? – 1505 | Average: 151 (30 Wells, Nimbus Engineers) |
| Total depths (ft) | | |
| Domestic | Range: 19 - 900 | Average: 265 (122 Well Completion Reports) |
| Municipal/Irrigation | Range: 112 – 905 | Average: 401 (17 Well Completion Reports) |

Active Monitoring Data

| Agency | Parameter | Number of wells /measurement frequency |
|-------------------------------|---|---|
| DWR Glenshire MWC | Groundwater levels | 13 wells semi-annually 7 wells monthly |
| T-TSA | Mineral, nutrient, & minor element. | 2 wells |
| Department of Health Services | as required in Title 22, Calif. Code of Regulations | 5 wells |

Basin Management

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|-------------------------|--|
| Groundwater management: | Truckee Donner PUD adopted an AB3030 plan in 1995 (Phase 1). PCWA adopted an AB3030 plan for the Placer County portion of Martis Valley in 1998 and then updated this plan in 2003. |
| Water agencies | |
| Public | Placer County Water Agency |
| Private | Truckee Donner PUD , Glenshire MWC, Donner Lake WC, Northstar CSD |

References Cited

- CH2MHILL. 1999. Water Reclamation Plant Expansion Project, Vol I and II.
- Hydro-Search, Inc. 1975. Availability of Ground Water, Truckee Donner Public Utility District, Nevada County, California, Prepared for the Truckee Donner Public Utility District, February 14, 1975,
- Hydro-Search, Inc. 1995. Ground Water Management Plan Phase 1 Martis Valley Ground - Water Basin No. 6-67 Nevada and Placer counties, California, Prepared for Truckee Donner Public Utility District January 31, 1995
- Nimbus Engineers. 2001. Ground Water Availability in the Martis Valley Ground Water Basin. Nimbus Job No. 0043

Additional References

- Helley, E.J., and D.S. Harwood. 1985. Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California. U.S. Geological Survey Miscellaneous Field Studies Map MF-1790.
- Hydro-Search, Inc.(HSI). 1980. Truckee and Vicinity, Ground-water Resource Evaluation, prepared for Dart Resources April 21, 1980
- North Tahoe Public Utility District, Consumer Confidence Report for 1999.
- Thodal, Carl E. 1997. Hydrogeology of Lake Tahoe Basin, California and Nevada, and Results of a Ground-Water Quality Monitoring Network, Water Years 1990-1992. Water-Resources Investigations Report 97-4072. USGS. 53 p.
- U.S. Geological Survey Water-Resource Investigations Report 78-124.

Errata

- Updated groundwater management information and added hotlinks to applicable websites.
(1/20/06)