362,000 ft^3/day and 145,000 ft^3/day respectively. A simulation was run where these two wells were removed from the model, while all other pumping wells remained. A comparison of model results with and without the Al Tahoe and Paloma wells was made. Simulated flows from groundwater to the lake increased from 145,000 ft^3/day to 314,000 ft^3/day, an increase of 169,000 ft^3/day. Simulated flows from the lake to groundwater decreased from 195,000 ft^3/day to 8,000 ft^3/day, a decrease of 187,000 ft^3/day. Thus, simulated results indicate about 37% of pumped water from the Al Tahoe and Paloma wells has the lake as its source. The simulated effect of the Al Tahoe and Paloma pumping wells on stream flows was less pronounced. With the Al Tahoe and Paloma wells turned off, simulated outflows at the lake from Trout Creek increased by 60,000 ft^3/day to 2,060,000 ft^3/day; simulated outflows at the lake from the Upper Truckee River increased by 40,000 ft^3/day to 1,060,000 ft^3/day.

8. SENSITIVITY ANALYSIS

8.1 General

An "average conditions" model was developed by employing averaged boundary condition values to the current calibrated model. Pumping rates at all wells were averaged for the period of 1996-2002 and input into the model. The average lake elevation for the period of 1957-2002 (6225 ft MSL) was input into the model. Averaged 1996-2002 stream flows (Section 2.3) were simulated by the model. Constant head values used in the spring 2002 calibration study were used. Recharge was set to an estimated average annual value of 0.003 ft/day (13.1 in/yr). Simulated discharge to the lake was 240,000 ft^3/day. The "average conditions" model was used for the analysis of the influence of model parameters and conceptualizations on simulated results.

Sensitivity analysis is used to measure the uncertainty in the calibrated model caused by uncertainty in estimates of aquifer parameters and boundary conditions. During sensitivity analysis, parameters are systematically changed, one at a time, within a predefined plausible range factor. The accompanying change in model results are then analyzed as a measure of the sensitivity of the model to that particular parameter. Factors of 0.5 and 2.0 were selected as a plausible range of aquifer parameters and boundary conditions.

8.2 Analysis of Hydrologic Parameters

The "average conditions" model (Section 8.1) was used to estimate the influence of various model parameters on groundwater discharge to the lake. Hydrologic parameters were varied by factors of 2.0 and 0.5. These parameters include horizontal hydraulic conductivity (Kh), vertical hydraulic conductivity (Kv), recharge to the water table, and lakebed conductance (COND). Results of this study are presented as Table 2.

Table 2. Sensitivity of simulated groundwater discharge to hydrologic parameters

Parameter	Initial Discharge (ft^3/day)	(x 2) (ft^3/day)	(x 0.5) (ft^3/day)
Kh	240,000	542,000	99,000
Kv	240,000	251,000	230,000
Recharge	240,000	274,000	224,000
Lakebed COND	240,000	242,000	182,000

8.3 Analysis of Variations in Lake Elevation

A study was performed to estimate the effects of lake elevation on groundwater discharge to the lake. Lake elevation simulated by the "average conditions" model (Section 8.1) was varied over the range of measured values between 1957 and 2002. Results of this study are presented as Table 3.

Table 3. Sensitivity of simulated groundwater discharge to lake elevation

Lake Elevation (ft MSL)	Discharge (ft^3/day)
6219	451,000
6222	353,000
6225	240,000
6228	139,000

8.4 Analysis of Effect of Lakebed Boundary Condition

Previous modeling efforts (Section 3) employed a vertical constant head boundary to represent the shoreline of the site. The current model used a GHB boundary condition that addressed the bathymetric surface, the vertical discharge component, and the conductance of the lakebed sediments. A study was performed to assess the effect of this new boundary condition on model results.

An "old boundary condition" model was constructed using the same hydrologic parameters as the "average conditions" model (Section 8.1), except the boundary condition representing the shoreline was specified as a vertical plane with a constant head of 6225 ft. This resulted in an increase in discharge to the lake from 240,000 ft^3/day to 503,000 ft^3/day. Figure 14 presents a graphical depiction on the effect of the new lakebed boundary representation.