

10. REFERENCES

- AGRA Earth & Environmental, Inc., 1999, Groundwater Modeling Study- Final Report For South Tahoe Public Utility District, South Lake Tahoe, California, 137 p.
- Allander, Kip, and David Prudic, 2000, Shallow Ground-Water Flow in Relation to Streamflow in the Upper Truckee River and Trout Creek Watersheds: U.S. Geological Survey, 7 p.
- Bergsohn, Ivo, 2002, Basin-Fill Isopach Map, South Lake Tahoe Groundwater Sub-Basin, South Lake Tahoe Public Utilities District.
- Einarson, M., 2003, Hydrostratigraphy of South Lake Tahoe, Groundwater and hydrostratigraphy science seminar, Incline Village, Nevada, Lake Tahoe Environmental Education Coalition.
- Fenske, Jon P., 1990, Erosion Control and Water Quality in the Tahoe Basin California-Nevada: Univ. of Nevada, Reno, Master Thesis, 155 p.
- Garcia, Kerry T., Rodney H. Munson, Ronald J. Spaulding, and Sonya L. Vasquez, 2002, Water Resources Data Nevada Water Year 2001: U.S. Geological Survey *Water-Data Report* NV-01-1, 44 p.
- Hill, Mary C., 1990, Preconditioned Conjugate Gradient 2 (PCG2), A computer program for solving ground-water flow equations, U.S. Geological Survey *Water-Resources Investigations Report* 90-4048, 43 p.
- Jeton, Anne E., 1999, Precipitation-Runoff simulation for the Lake Tahoe Basin, California and Nevada: U.S. Geological Survey *Water-Resources Investigations Report* 99-4110, 61 p.
- Jeton, Anne E., 2000, Precipitation-Runoff simulation for the Upper Part of the Truckee River Basin, California and Nevada: U.S. Geological Survey *Water-Resources Investigations Report* 99-4282, 41 p.
- Kavvas, Levent M., Jae Young Yoon, Z-Q Chen, Dan Easton, and John C. Dogrul, 2000, Modeling Flow, Sediment, and Nutrient Transport From the Lake Tahoe Watersheds: Univ. of California, Davis, Dept. of Civil and Environmental Engineering, 4 p.
- Lico, Michael S. and Nyle Pennington, 1999, Concentrations and Distribution of Manmade Organic Compounds in the Lake Tahoe Basin, Nevada and California, 1997-99: U.S. Geological Survey *Water-Resources Investigations Report* 99-4218, 12 p.
- Loeb, Stanford R. and collaborators/students, 1987, Groundwater Quality Within the Tahoe Basin: Univ. of California, Davis, Institute of Ecology Division of Environmental Studies, 265 p.

- McDonald, M.G., and A.W. Harbaugh, 1988, "A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model": U.S. Geological Survey *Open-File Report* 83-875.
- Miller, D.H., 1955, Snow Cover and Climate in the Sierra Nevada California: Publications in Geography Vol. 11: Univ. of California Press, Berkeley CA, pp. 65-87.
- Prudic, David E. and Graham E. Fogg, 2000, Hydrology of the Tahoe Basin Field Trip Guidebook: U.S. Geological Survey and Univ. of California, Davis, Hydrologic Sciences, 3 p.
- Reuter, John E., Alan D. Jassby, Charles R. Goldman, and Alan C. Heyvaert, 2000, Contribution of Basin Watersheds and Atmospheric Deposition to Eutrophication at Lake Tahoe, CA-NV, USA: Tahoe Research Group and Univ. of California, Davis, Dept. of Environmental Studies and Policy, 4 p.
- Rowe, Timothy G., and Kip K. Allandar, 1996, Surface- and Ground-Water Characteristics in the Upper Truckee River and Trout Creek Watersheds, South Lake Tahoe California and Nevada, July-December 1996: U.S. Geological Survey *Water-Resources Investigations Report* 00-4001, 39 p.
- Scott, Vernon H., Joseph C. Scalmanini, and Robert A. Mathews, 1978, Groundwater Resources of the South Tahoe Public Utilities District, *Science and Engineering Papers no. 2007*: Univ. of California, Davis, Dept. of Water Science and Engineering, 62 p. plus app.
- Tahoe Regional Planning Agency and U.S. Forest Service, 1971, Geology and Geomorphology of the Lake Tahoe Region – A Guide for Planning; South Lake Tahoe, CA, 59 p.
- Thodal, Carl E., 1995, Hydrogeologic Setting and Ground-Water Quality of Areas Tributary to Lake Tahoe in Douglas County and Carson City, Nevada, Through 1987: U.S. Geological Survey *Water-Resources Investigations Report* 94-4079, 31 p.
- Thodal, Carl E., 1997, Hydrogeology of Lake Tahoe Basin, California and Nevada, and Results of a Ground-Water Quality Monitoring Network, Water Years 1990-92: U.S. Geological Survey *Water-Resources Investigations Report* 97-4072, 53 p.
- Trask, James C., and Graham E. Fogg, 2000, Water Budget for Lake Tahoe: Univ. of California, Davis, Hydrologic Sciences, 6 p.
- Woodling, John K., 1987, A Hydrogeologic Investigation of Ground Water – Lake Interaction in the Southern Tahoe Basin: Univ. of California, Davis, Master Thesis in Earth Sciences and Resources, 126 p.

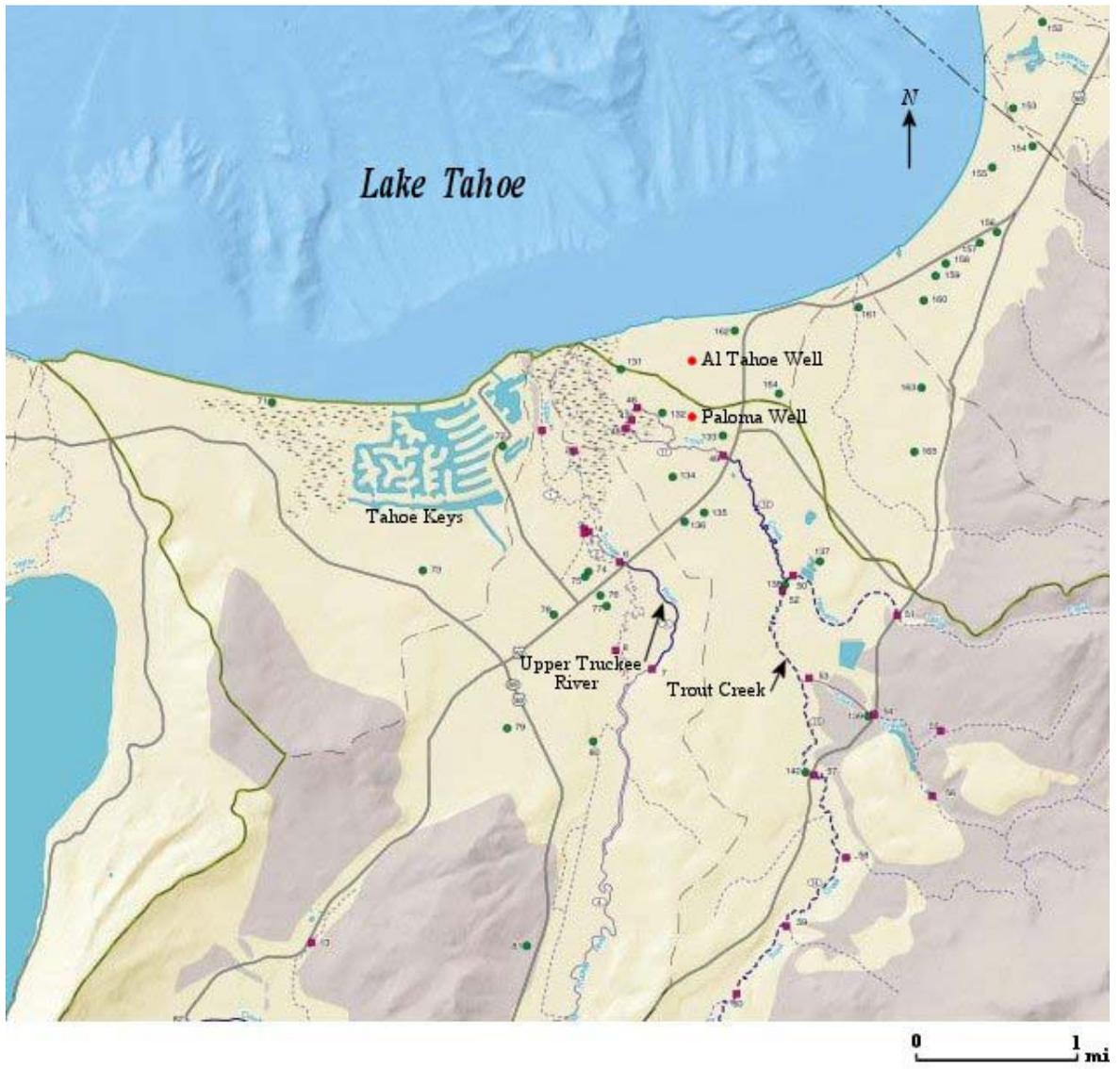


Figure 1 Study area

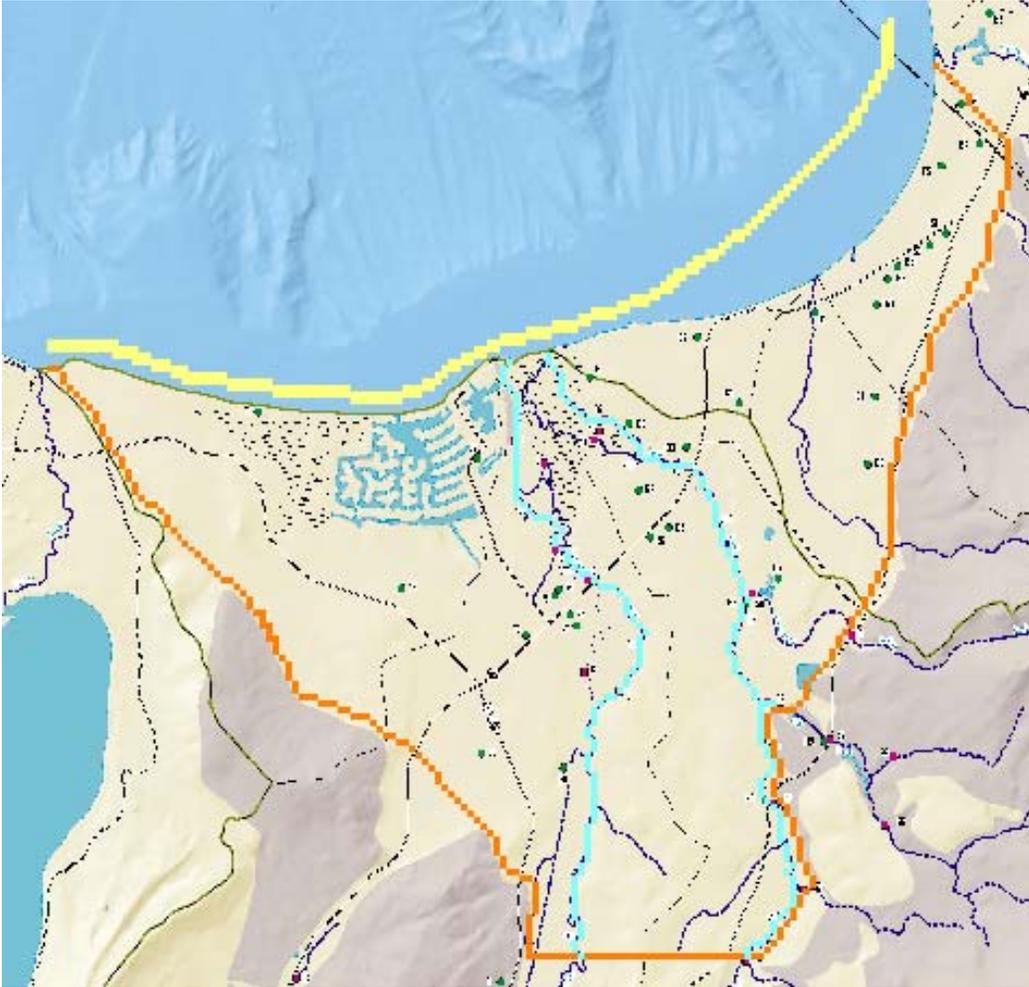
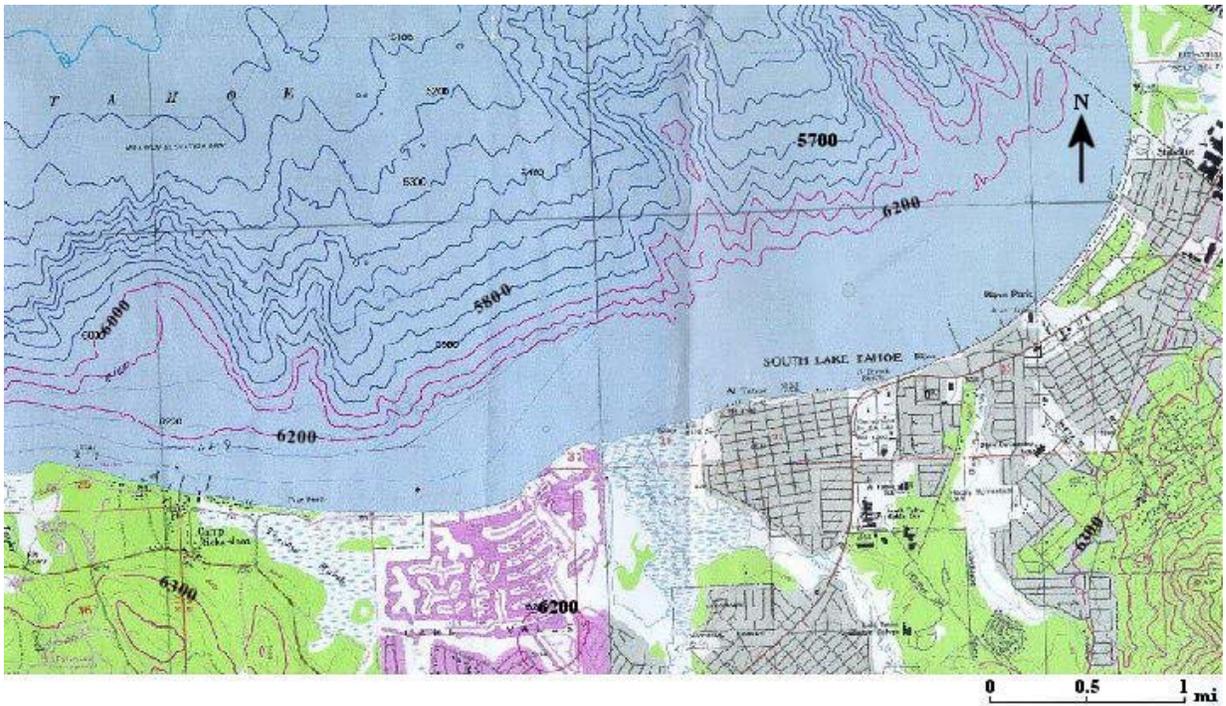
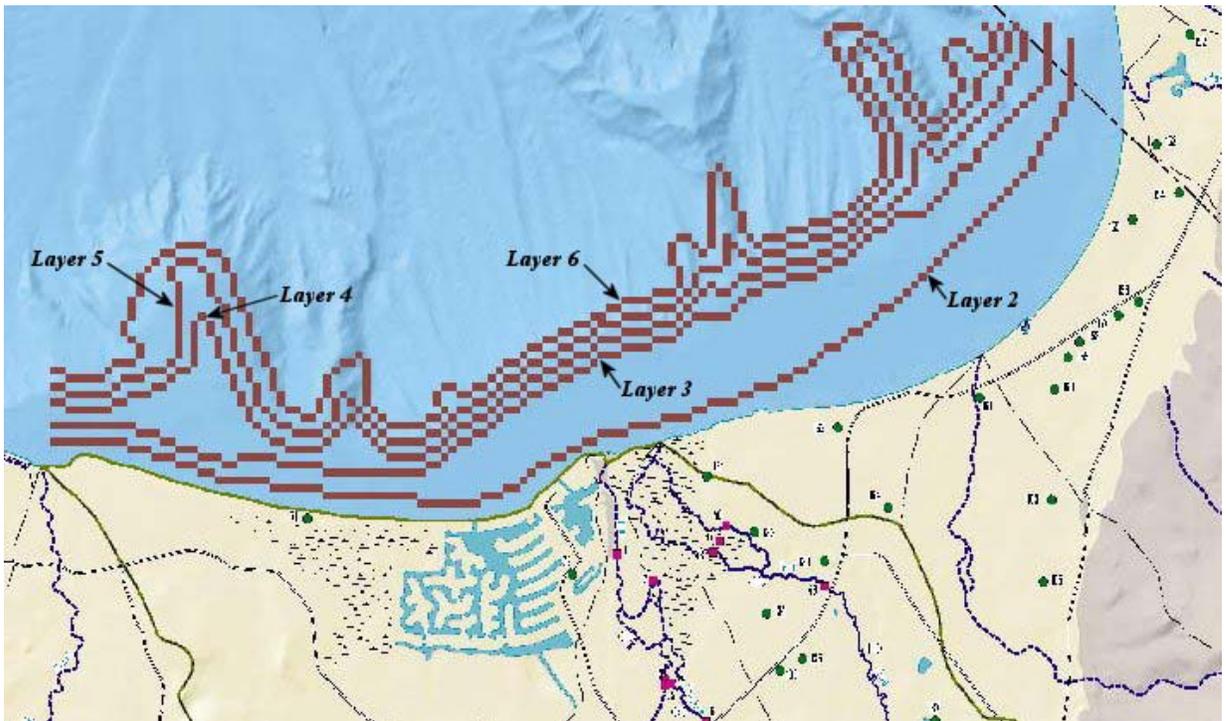


Figure 2 Representation of model boundary conditions. Orange represents a constant-head boundary. Yellow represents a head-dependent flux boundary. Blue represents the MODFLOW Stream Package.



(a)



(b)

Figure 3 (a) Lakebed elevation at south Lake Tahoe and (b) lakebed elevation simulated by model.

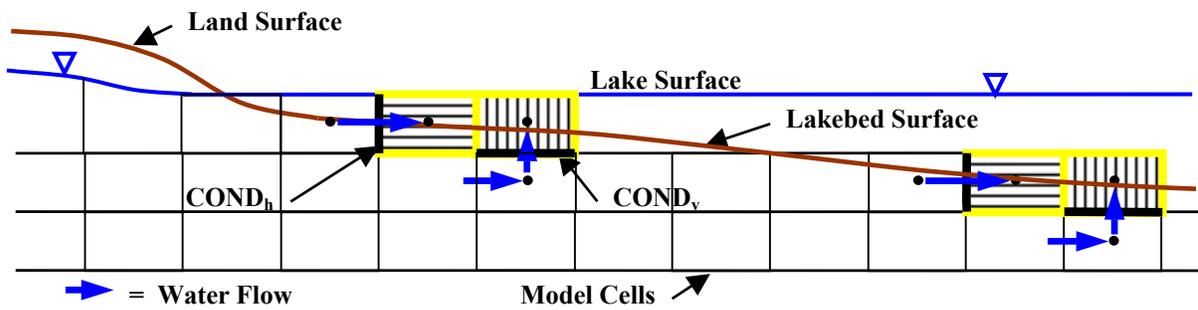


Figure 4 Representative profile of General Head Boundary (GHB) configuration used to simulate lake-groundwater interaction.

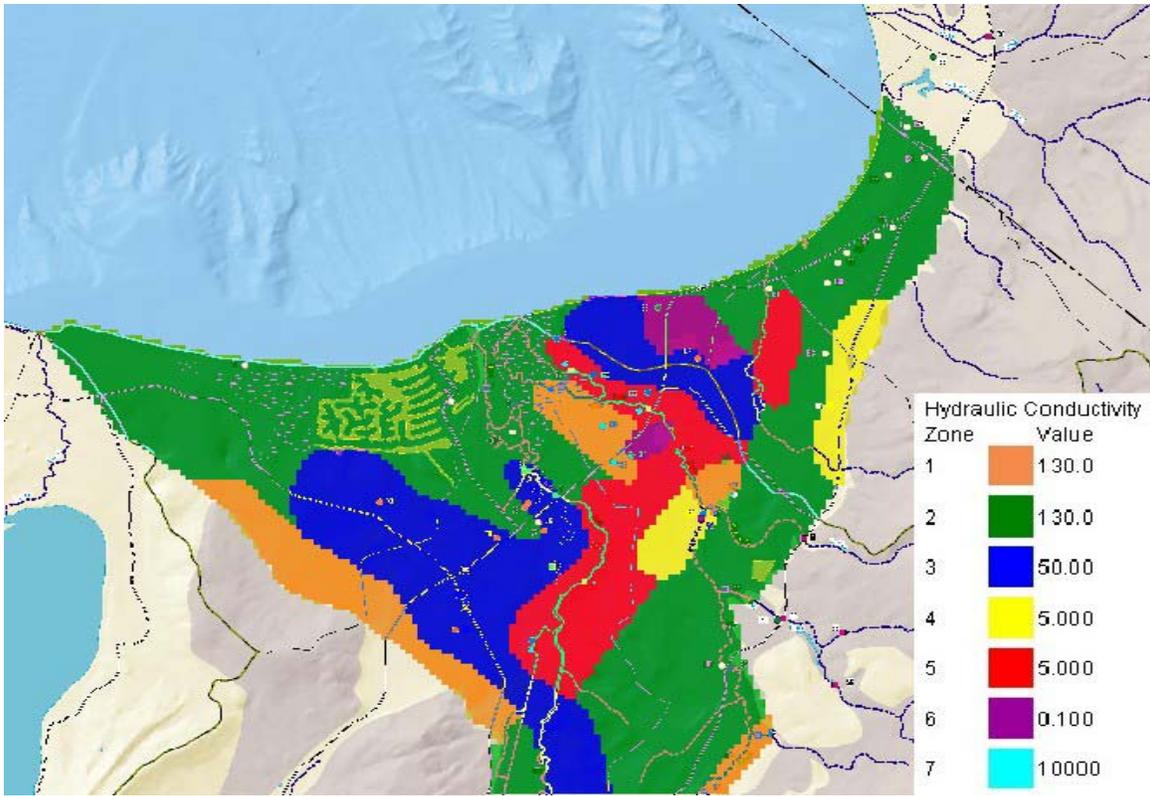


Figure 5 Representation of layer 1 hydraulic conductivity (K_h) used in model.

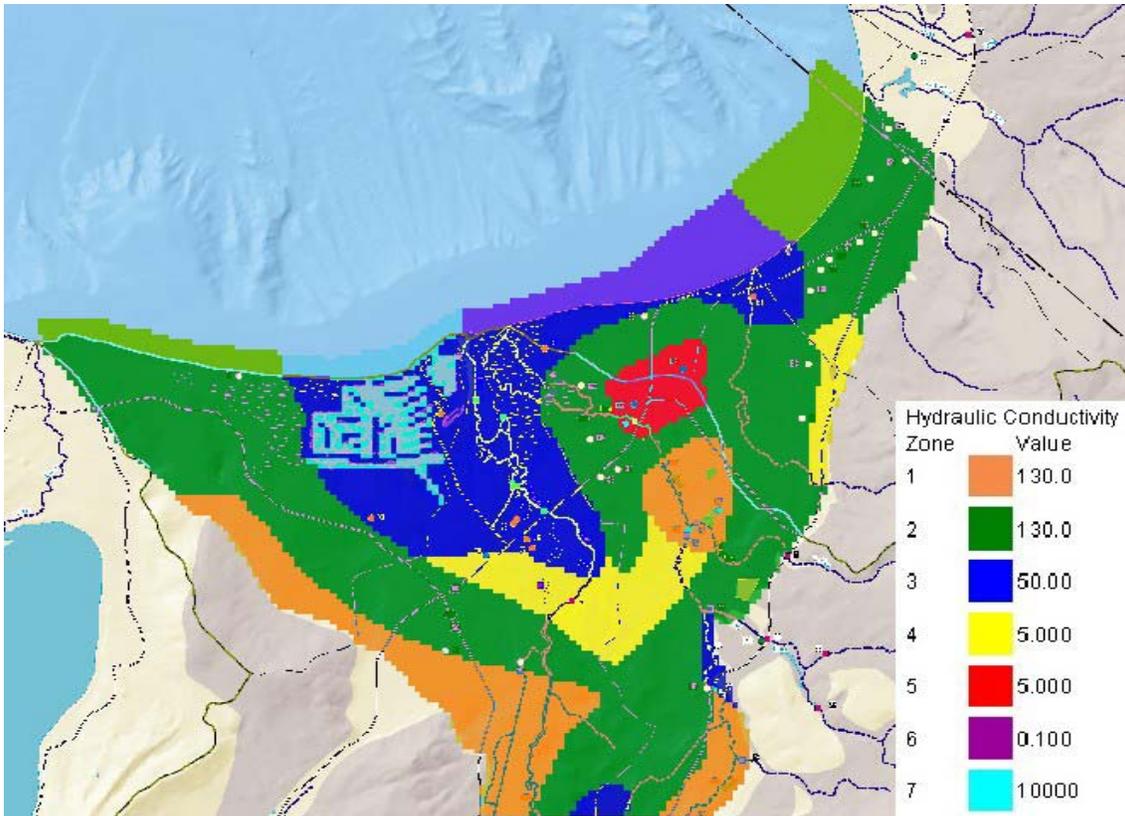


Figure 6 Representation of layer 2 hydraulic conductivity (K_h) used in model.

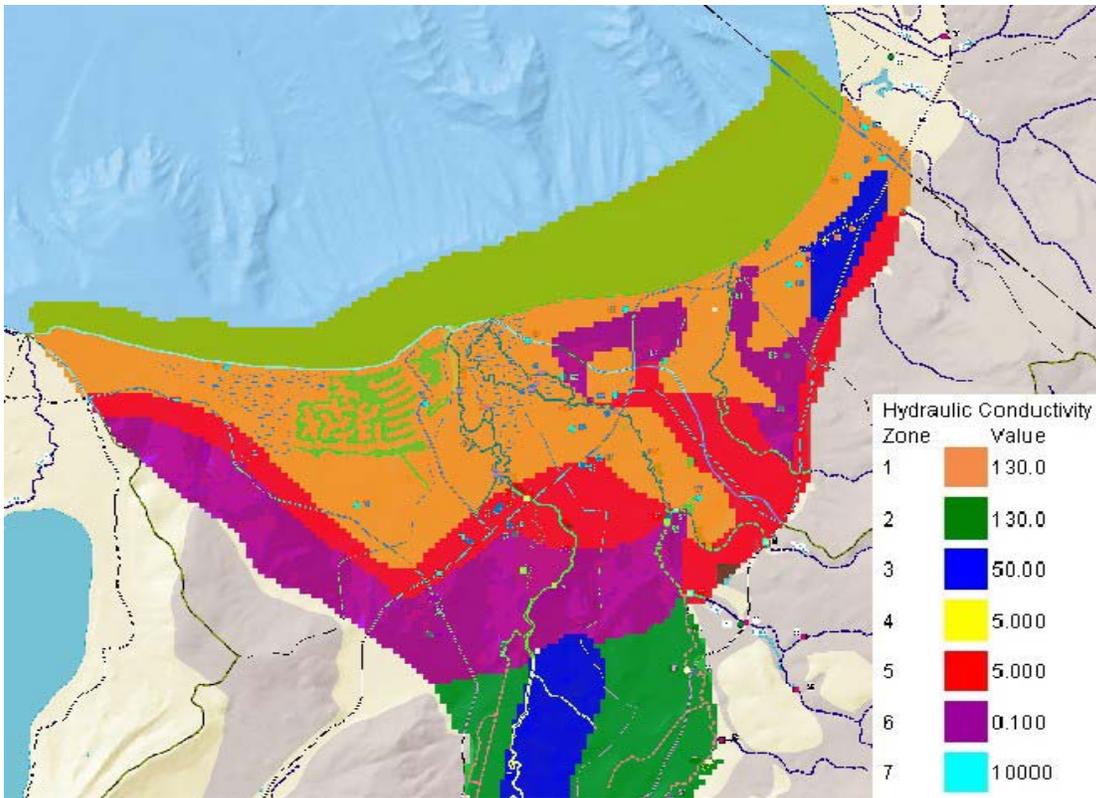


Figure 7 Representation of layer 3 hydraulic conductivity (K_h) used in model.

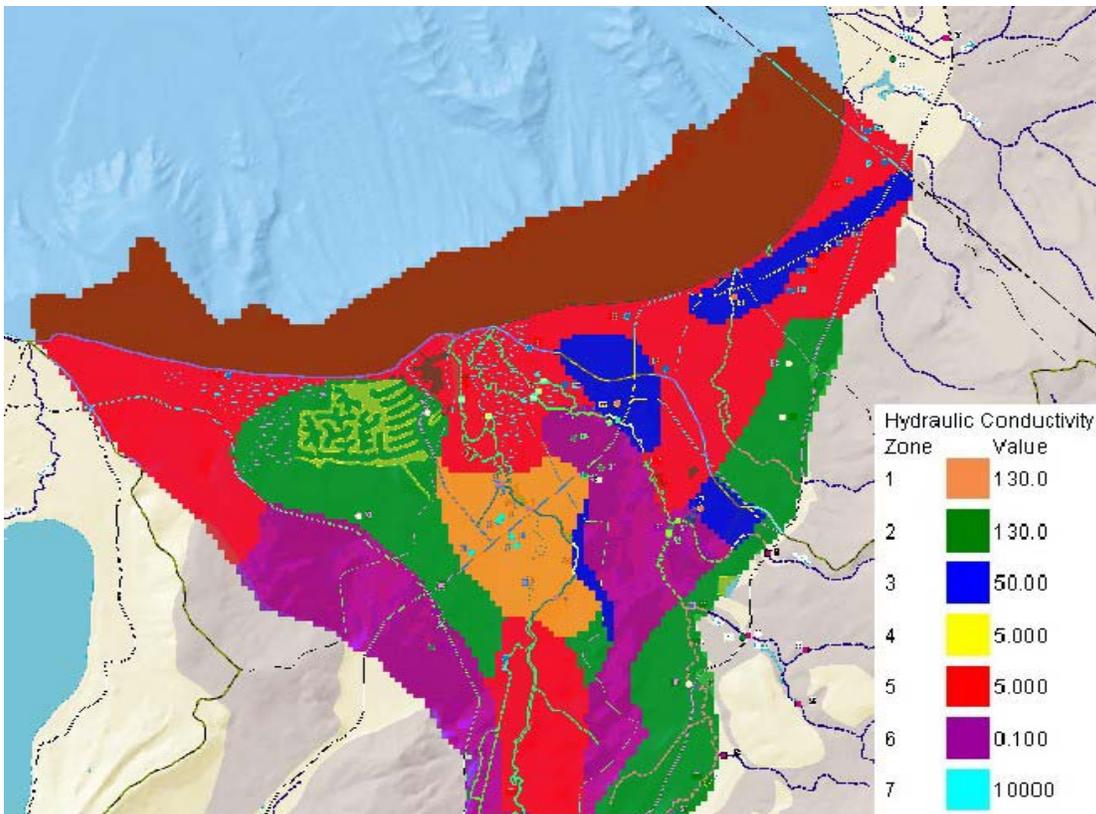


Figure 8 Representation of layer 4 hydraulic conductivity (K_h) used in model.

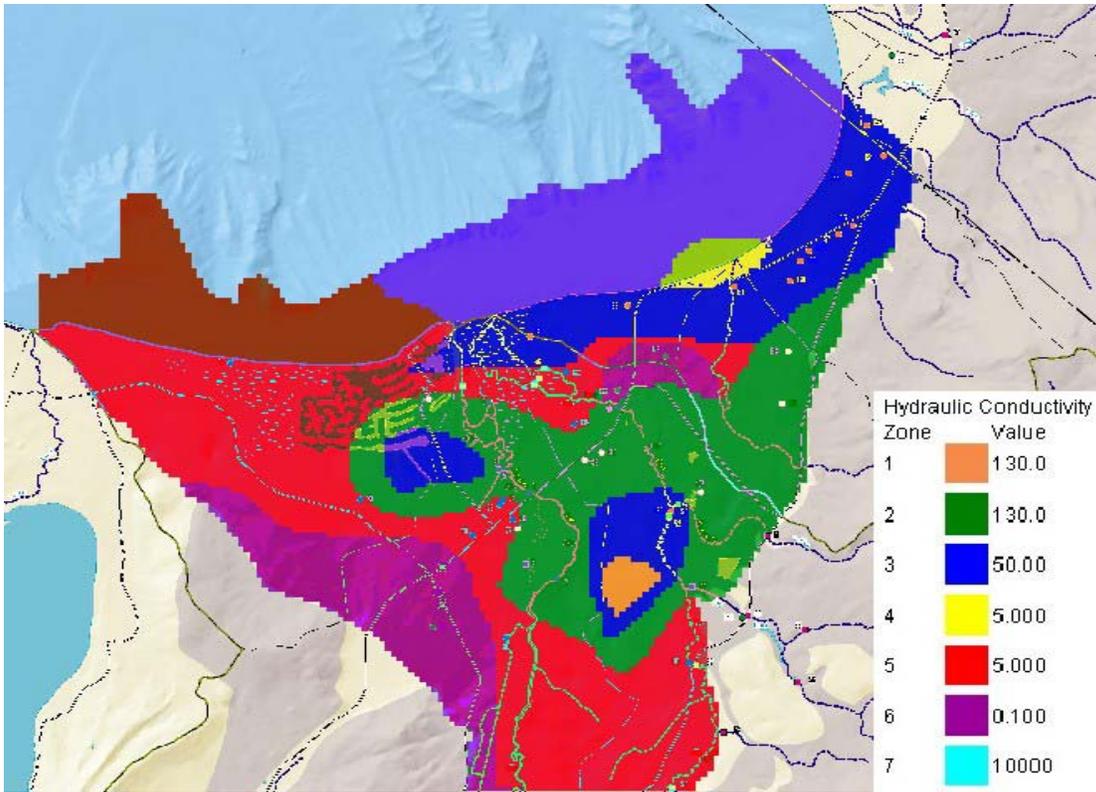


Figure 9 Representation of layer 5 hydraulic conductivity (K_h) used in model.

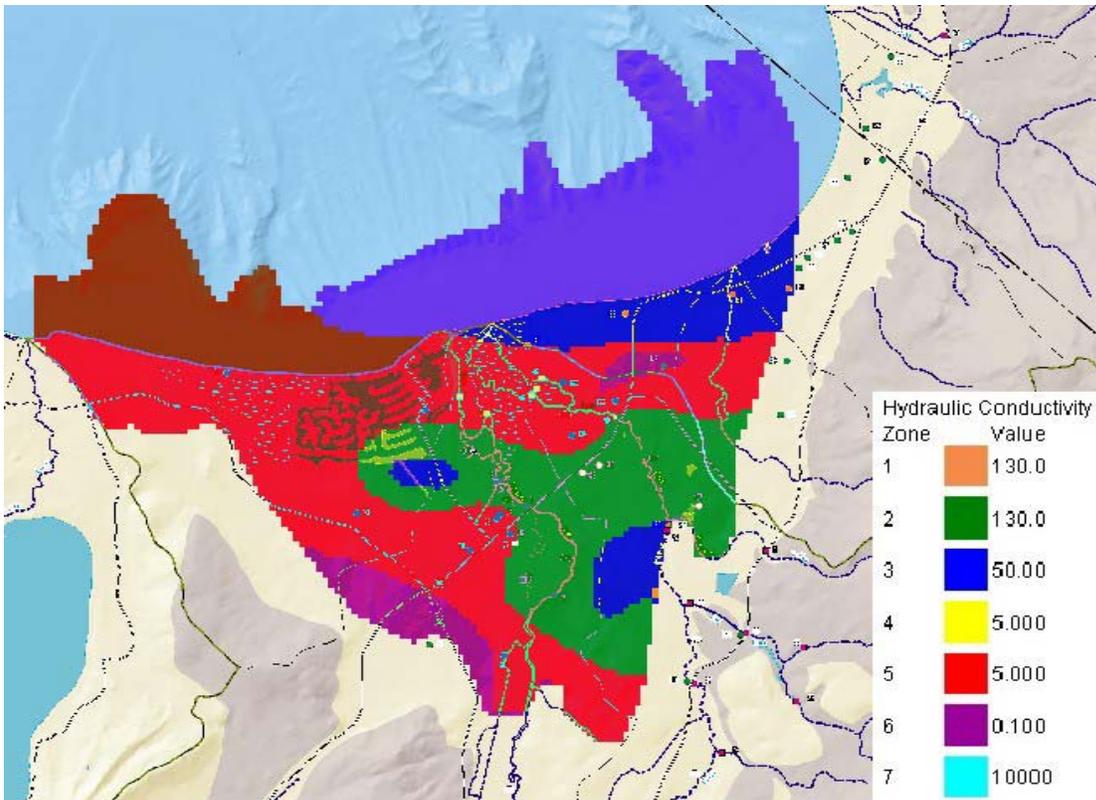
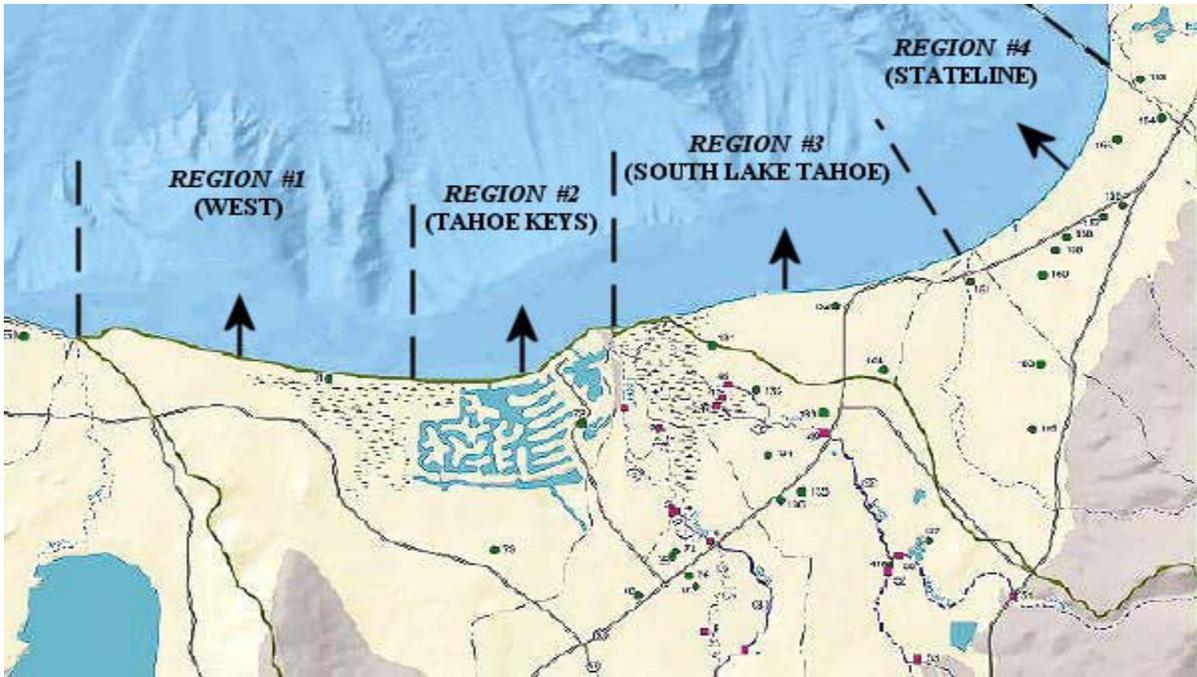


Figure 10 Representation of layer 6 hydraulic conductivity (K_h) used in model.



TOTAL (INFLOW) FLUX TO LAKE BY REGION					
	REGIONS				Total
	1	2	3	4	
High Discharge	64,146	151,986	7,260	82,860	306,252
Low Discharge	22,697	68,947	124	53,314	145,082
Average Discharge	43,422	110,466	3,692	68,087	225,667

* Values in ft³/day (cfd)

NET (INFLOW-OUTFLOW) FLUX TO LAKE BY REGION					
	REGIONS				Total
	1	2	3	4	
High Discharge	60,253	114,310	-92,014	82,860	165,409
Low Discharge	14,279	12,703	-108,825	53,059	-28,784
Average Discharge	37,266	63,507	-100,420	67,959	68,312

* Values in ft³/day (cfd): (-) flow out of lake, (+) flow into lake

Figure 11 Delineation of south Lake Tahoe shoreline and tables of total and net fluxes per region for various scenarios. The shoreline length of Region 1 is approximately 9200 ft. The shoreline length of Region 2 is approximately 6000 ft. The shoreline length of Region 3 is approximately 9700 ft. The shoreline length of Region 4 is approximately 8600 ft.

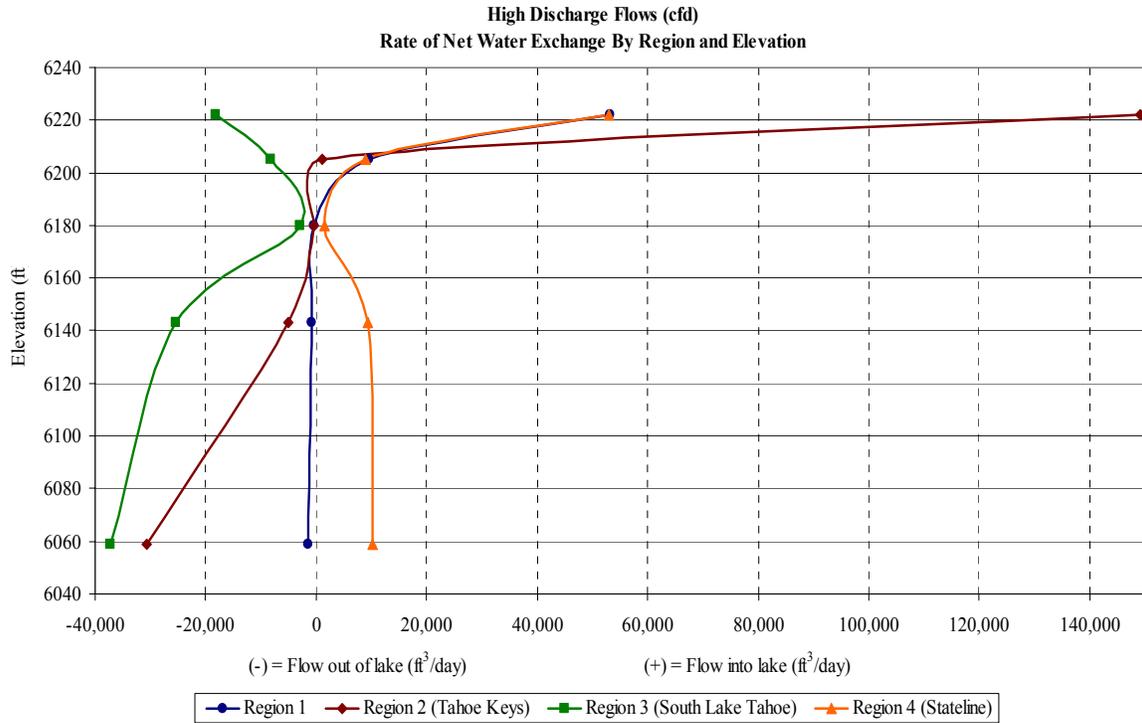


Figure 12 Side-view representation of “high discharge conditions” water exchange between groundwater and south Lake Tahoe.

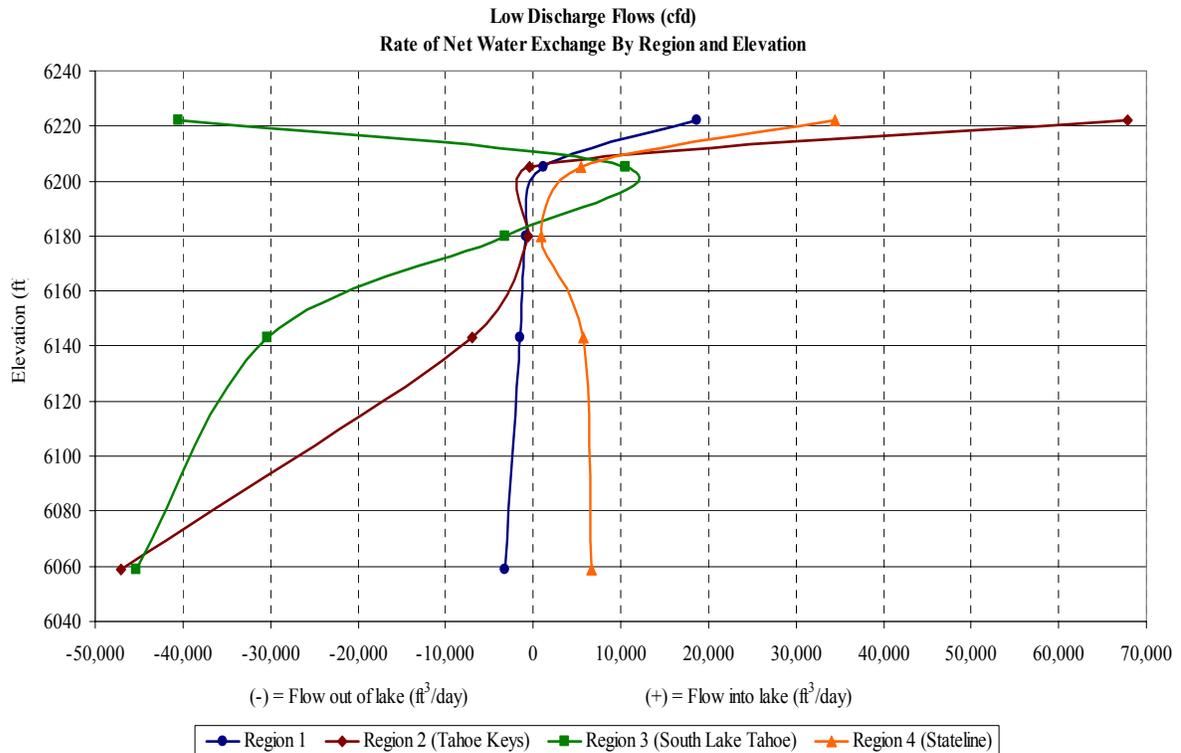


Figure 13 Side-view representation of “low discharge conditions” water exchange between groundwater and south Lake Tahoe.

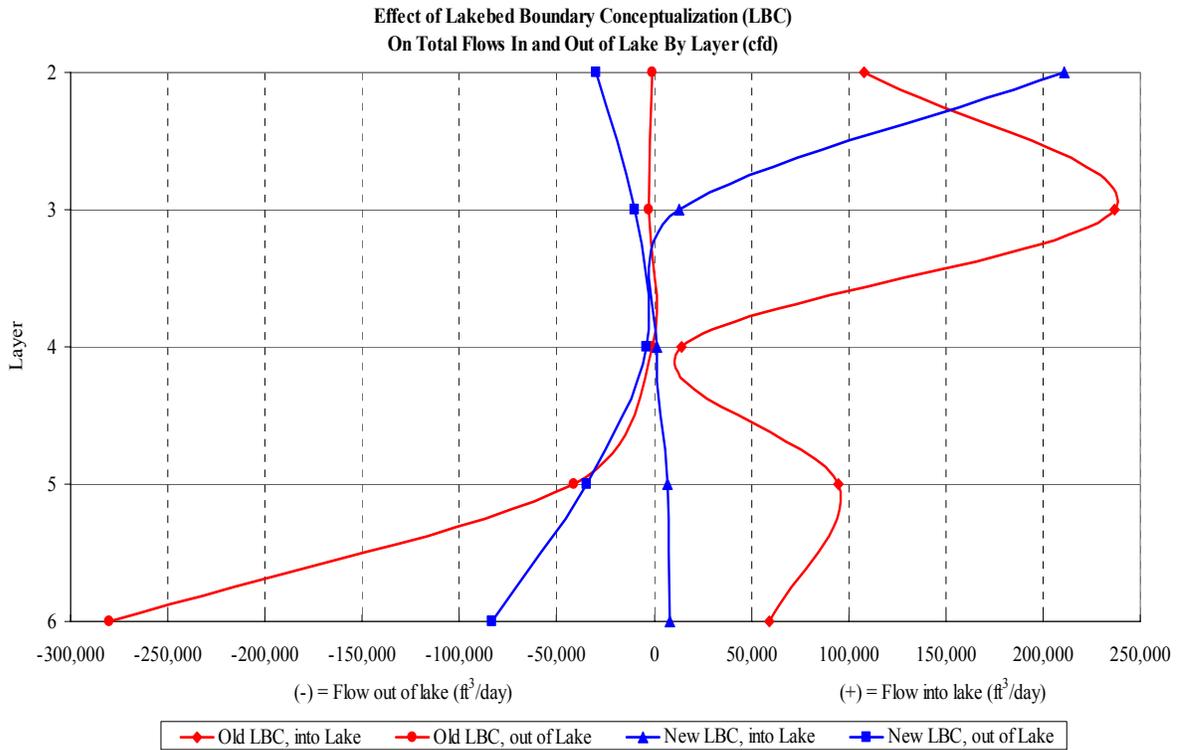


Figure 14 Side-view representation of effect of GHB boundary conceptualization on water exchange between groundwater and south Lake Tahoe.