

Groundwater Processes

The groundwater processes central to Butte County's water resources issues include both unconfined and confined aquifers, multiple aquifer systems, and pumping impacts on the aquifers. As noted in the progress report, the USGS PRMS model simulates aquifers as infinite, unconfined storages which preclude its use in Butte County water resources studies. As such only the MIKE-SHE and WEHY models are compared here.

For the WEHY model, the groundwater simulation is currently provided by using the Prickett-Lonquist Aquifer Simulation Model (Prickett and Lonquist, 1971). With this model, two-dimensional, steady state and transient flow in a heterogeneous, anisotropic aquifer (confined or unconfined) can be simulated. The effects of variable pumping can be simulated as well. For confined aquifers, both leaky and nonleaky confining beds can be simulated. The aquifers can be dynamically linked to surface water zones and unsaturated zones as well as to river channels. The groundwater equations are solved in a finite difference format.

The MIKE-SHE model simulates both confined and unconfined aquifers in user specified arrangements using a finite difference approach. Pumping and leakage between aquifers can also be modeled. The groundwater model is linked dynamically to the surface and unsaturated zone making it suitable for surface-groundwater interaction studies.

As can be seen from the above descriptions, WEHY and MIKE-SHE have similar groundwater modeling capabilities. The differences in the models come in their handling

of surface water and surface-groundwater interaction processes which are described in the next sections.