

# *Ground Water Hydrology*

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ACE staff have developed and managed several ground water investigations in support of water rights cases and mining development. These investigations have included hydrogeologic analyses, ground water flow modeling, geochemical evaluations, mine dewatering, water quality studies, and impact analyses. ACE engineers and scientists have developed computer models for ground water dewatering, ground water restoration, and contaminant migration. Our staff has used a variety of ground water modeling tools including: Visual MODFLOW, MODFLOW, PLASM, WATEQF, and PHREEQE.

## **General support services include:**

- Large basin-wide aquifer investigations using finite difference and finite element ground water models. These are pursued often as an integrated part of river basin planning studies and/or conjunctive use investigations.
- Individual well investigations, including pump-testing and effects of well pumpage on stream systems for water rights studies.

## **Specific projects managed or participated in by ACE include:**

- *Caballo Rojo Coal Mine Permit Revision, Gillette, WY:* ACE staff developed an extensive ground water model for the mine as part of its permit revision. Using MODFLOW, ACE staff evaluated impacts associated with the mine as well as cumulative impacts of three additional contiguous mines. The quasi-three dimensional finite difference model included the coal and overburden (Wasatch) aquifers, open pits, and backfill conditions.
- *Indian Creek P.U.D. Water Supply Study, Masonville, CO:* ACE staff performed a reconnaissance level investigation of a fractured rock aquifer to supply domestic water for a planned rural development.
- *Paragon Point Subdivision, Fort Collins, CO:* ACE engineers completed the design and development of an infiltration gallery and pump system to supply water for parks and open space irrigation for the Paragon Point P.U.D.
- *Pine Bluffs Water Supply Investigation, Pine Bluffs, WY:* ACE staff participated in the investigation of declining production in certain wells, inspected pumps, and documented the hydrogeologic and hydraulic characteristics of the Brule aquifer. In addition, ACE staff prepared a well head protection plan to ensure protection of the Town's water supply.
- *Rambler Mine Reclamation Project, Albany, WY:* Ground water conditions were investigated for incorporation to the reclamation plan of an abandoned copper mine. Final reclamation of the site included an anoxic limestone drainage system to reduce elevated copper concentrations and isolation of unsuitable materials from contact with the ground water table.