



Ground Water Investigation Program Montana Bureau of Mines and Geology

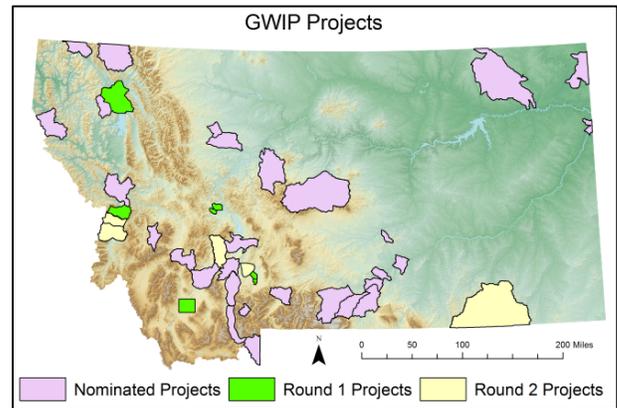
In Montana, groundwater is essential for safe drinking water supplies and for economic growth. On average, approximately 272,000,000 gallons (835 acre feet) are extracted from Montana's aquifers every day. In many areas of the State, groundwater is the only reliable year-round source of water for household use and for livestock. Groundwater is also widely used for irrigated agriculture, and for lawns and gardens. In some settings, groundwater withdrawals could directly affect senior water rights holders, stream flows, the availability of irrigation water, and the health of aquatic ecosystems. Efficient water management in these areas requires a well founded understanding of the groundwater systems.

In 2009 the Montana State Legislature established the Ground Water Investigation Program (GWIP) within the Montana Bureau of Mines and Geology (MBMG) to conduct detailed groundwater investigations in specific areas with the most serious concerns. Over forty projects have been nominated to date and prioritized by the Groundwater Steering Committee. Seven investigations were initiated in 2009. Five additional areas were selected to begin during 2011 and 2012. Each investigation is expected to take from 1 to 3 years to complete.

The results of each study will include a detailed report describing the hydrogeologic system of the area and a comprehensive set of data. These products are intended to provide a more detailed understanding of the groundwater system and tools which can then be used by regulators, senior water-right holders, new water-right applicants, and other stakeholders, to make informed water management decisions and to help anticipate hydrogeologic effects from changes in land use.

Investigations begun during 2009:

1) North Hills area, Helena — Increased subdivision development in this area raises the concerns of declining water levels, and the possibility of degraded water quality. (MBMG Open-File Report 610).



2) Four Corners area, Gallatin County — Conversion from irrigated agriculture to high-density residential land use has raised concerns about changes in water quality, water availability, and effects on surface water.

3) Belgrade — Increased development of shallow groundwater may lower the water table and impact surface water availability and quality.

4) Lower Beaverhead River, Dillon — The current increase in the number of high-volume irrigation wells has raised concerns regarding stream depletion and impacts to senior water-rights holders.

5) Scratchgravel Hills, Helena — Increased subdivision development is creating concerns about groundwater depletion and water quality impacts.

6) Florence — Higher population density has increased the demand on the aquifer and raising the possibility of groundwater degradation.

7) Flathead Valley Deep Confined Aquifer — Increased groundwater utilization, and localized water-level declines, have raised concerns about the long-term sustainability of the aquifer and the possibility of degradation to groundwater and surface-water quality.

Investigations begun during 2012:

1) Stevensville—The feasibility of using groundwater to supplement surface water for irrigation will be investigated.

2) Boulder River Valley — Groundwater availability for subdivision development and the potential to use the aquifer as a storage reservoir will be investigated.

3) Hamilton — Increasing population density may stress the aquifer and has raised the possibility of groundwater degradation.

4) Manhattan — Development of shallow groundwater may impact stream flow and water quality.

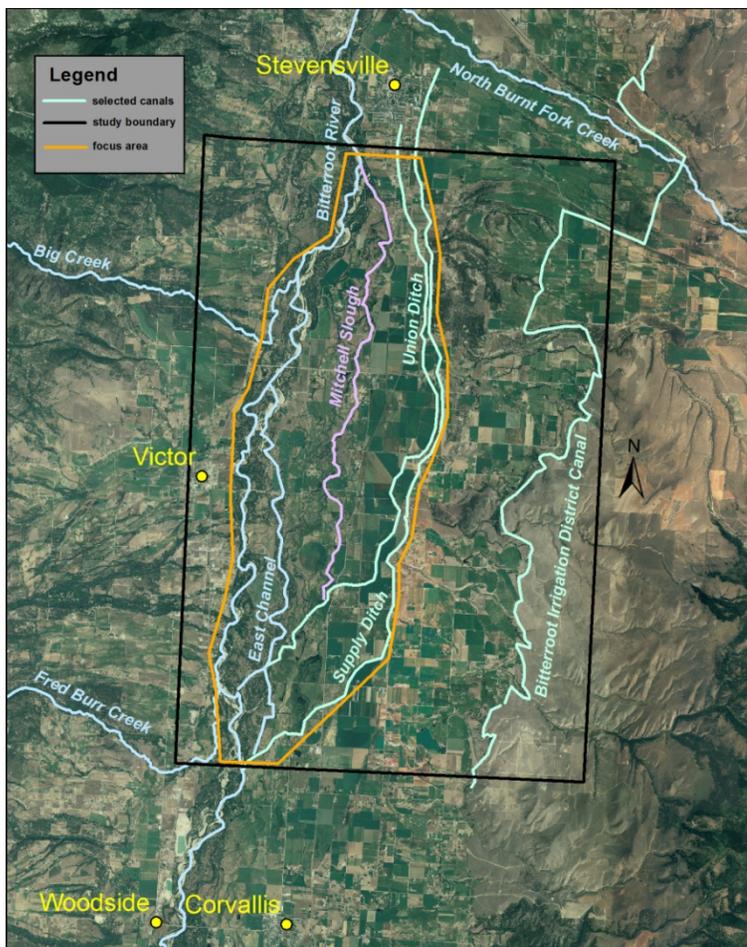
5) Coalbed Methane (CBM)—Development of CBM in the Powder River Basin has raised concerns regarding aquifer depletion and mobilization of salts.

Visit the website (<http://www.mbm.mtech.edu/gwip/gwip.asp>) for more details about the GWIP program.

GWIP Project Area: Stevensville Shallow Aquifer Investigation, Ravalli County

The Stevensville Shallow Aquifer Investigation area, located in the Bitterroot Valley, will address concerns raised by irrigators about the expense and practicality of maintaining current diversion and distribution. One option the irrigators may consider in the future is moving some water diversions from surface water to groundwater wells. This investigation will provide them with the information needed to consider this option. Six irrigation canals divert water from a reach of the Bitterroot River locally called the East Channel. Approximately 3,500 acres, including some of the most productive farmland in the Bitterroot Valley, are irrigated from this source. During the past several decades, irrigators have maintained flow into the Channel by excavating a canal from the main Bitterroot River to the East Channel. Construction and regular maintenance of the canal is necessary because the main river channel is migrating westward. The canal is presently about 3,000 feet in length and is being extended each year. There is significant concern among irrigators that maintenance of the canal will not technically or economically be feasible in the near future.

The study will focus on the area lying between the Union Ditch and the main channel of the Bitterroot River beginning at the headgate and extending north (downstream) near the town of Stevensville. Two large irrigation systems, the Supply and the Bitterroot Irrigation District, are located above the Union Ditch.



This project will evaluate the scientific feasibility of using groundwater to supplement or replace irrigation water that is currently supplied by water diverted from the East Channel. Irrigation needs supplemented by groundwater may provide a more reliable source of irrigation water, particularly during droughts, and leave more surface water in the streams during periods when low flows are detrimental to fish and wildlife. A numerical groundwater model will be developed and used to evaluate various scenarios of groundwater use. This project is nearly ideal in terms of gaining a better understanding of groundwater-surface water interactions, a major goal of GWIP*.

The products of this investigation will include an interpretive report and a groundwater flow model. These publicly available products will provide land owners and public agencies with scientific information to help make data-driven water management decisions about how proposed changes in irrigation activities may affect groundwater and surface water in the area. Current Montana Bureau of Mines and Geology personnel assigned to this project include:

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*GWIP: Montana Bureau of Mines and Geology – Ground Water Investigation Program (<http://www.mbmng.mtech.edu/gwip/gwip.asp>)