

Ground Water Investigation Program



PUBLICLY AVAILABLE RESULTS INCLUDE

- ⇒ Detailed, peer-reviewed MBMG published reports, with more in review.
- ⇒ Computer models of site-specific groundwater flow are available for use.
- ⇒ Each project's scientific teams answer public inquiries regarding the hydrogeology of GWIP areas.
- ⇒ Comprehensive sets of hydrogeologic data for each investigation are publicly available in GWIC database.
- ⇒ Presentations to stakeholders and other interest groups.

The *Ground Water Investigation Program (GWIP)* answers locally identified, site-specific questions prioritized by the Montana Ground Water Steering Committee (MCA 85-2-525). As mandated by the Montana Legislature, GWIP conducts research on the most urgent water issues in the state.

FOR MORE INFORMATION CONTACT:
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PUBLISHED REPORTS (2021-2022)

An investigation of spring sources and potential alternative water supplies near Virginia City, Montana, 2022, Report of Investigations, RI 30

Hydrogeology and groundwater availability at Big Sky, Montana, 2022, Open-File MBMG 747

Hydrogeologic investigation of the Upper Jefferson River Valley, Madison and Jefferson Counties, Montana: Waterloo groundwater modeling report, 2021, Report of Investigations, RI 29

Hydrogeologic investigation of the Upper Jefferson Valley, Montana-Interpretive report, 2021, Report of Investigations, RI 28

West Crane aquifer test summaries, Richland County, 2021, Open-File MBMG 737

Hydrology and water management of the Clear Lake aquifer, 2021, Open-File MBMG 738

Aquifer tests completed in the Bitterroot Valley, Hamilton area, 2021, Open-File MBMG 739

Groundwater model of the Meadow Village aquifer at Big Sky, 2021, Open-File MBMG 742

PROJECTS STARTING 2022

Big Hole Beaverhead, Madison, and Silver Bow Counties

Purpose: Investigate the effects of irrigation return flows on the Big Hole River in the Melrose area. The project will focus on measurement and modeling of the groundwater surface-water interactions with special consideration to temperature effects on the river.

Status: Meetings with stakeholders and an initial field visit have been conducted. Data compilation and project planning is in progress. The monitoring network will be established this year.

Personnel: Ron Breitmeyer, Principal Investigator

Eureka Lincoln County

Purpose: Understand how groundwater development will affect the availability of groundwater and surface water in the Tobacco Valley, Eureka.

Status: Meetings with stakeholders and an initial field visit have been conducted. Data compilation and project planning is in progress. The monitoring network will be established this year.

Personnel: Andy Bobst, Principal Investigator

Irrigation Recharge Carbon and Beaverhead Counties

Purpose: Quantify the infiltration of groundwater beneath fields subjected to flood and pivot irrigation. The project will focus on direct measurement of infiltration through the vadose zone to determine the potential for irrigation-derived groundwater recharge under different operational conditions.

Status: Meetings with stakeholders and an initial field visit have been conducted. Data compilation and project planning is in progress. The monitoring network will be established this year.

Personnel: Ron Breitmeyer, Principal Investigator

West Billings Yellowstone County

Purpose: Identify and quantify recharge sources and controls on groundwater quantity and quality in the Billings area to support future development decisions.

Status: Meetings with stakeholders and an initial field visit have been conducted. Data compilation and project planning is in progress. Monitoring sites are currently being established.

Personnel: Liddi Meredith, Principal Investigator

ACTIVE PROJECTS

East Flathead Valley Flathead County

Purpose: Determine the connection between the shallow aquifer, deep alluvial aquifer and surface water. This information will be used to evaluate the effects of pumping on these aquifers and on surface water.

Status: Data collection is complete, including drilling and aquifer testing. Groundwater model development is underway. A draft interpretive report and model report are in preparation.

Personnel: Andy Bobst, Principal Investigator

Ennis Area Madison County

Purpose: Investigate the effects of increased residential development and groundwater withdrawals in the bedrock aquifer on the west side of the Ennis Valley. Implications for increased withdrawals on adjacent aquifers will be considered.

Status: Data collection is complete. Data interpretation and report preparation will commence in 2022.

Personnel: Mary Sutherland, Principal Investigator

Lolo Creek Missoula County

Purpose: Determine the cause of changes in streamflow character that occur in the lowest reaches of Lolo Creek, resulting in the channel occasionally being dry.

Status: Groundwater model development and report preparation are underway. The geologic framework, water budget, and model calibration are complete. The model will help quantify the water budget and the effects of hydrologic stresses on Lolo Creek. A draft report is in preparation.

Personnel: Ali Gebriel, Principal Investigator

Upper Gallatin Gallatin County

Purpose: Evaluate the effects of existing and future residential/commercial development in the Upper Gallatin Valley on water quantity and quality.

Status: Groundwater and surface-water monitoring is complete, including aquifer testing. Data interpretation and groundwater model development is underway to predict groundwater availability and quality from increased residential development. A draft interpretive report and modeling report are in preparation.

Personnel: James Rose, Principal Investigator



Developing the hydrogeologic framework, monitoring, and communicating results to the public.

IN REVIEW

Belgrade/Manhattan Gallatin County

- Purpose:** Assess the effects of pumping from high capacity wells for a municipality or subdivision on groundwater and surface-water resources.
- Results:** The valley geology dictates the ideal location of a high yield water supply. Thick sediments in the central valley are conducive to development with the distance to surface water and the timing of mitigation considered for minimizing effects.
- Personnel:** Mary Sutherland, Principal Investigator

Flathead Valley Flathead County

- Purpose:** Determine whether withdrawals from the deep aquifer affect surface-water resources; and if current stresses are creating declining water-level trends.
- Results:** Pumping has created water-level declines in some areas, but not valley-wide. The deep sand and gravel aquifer is overlain by a confining layer over most of the valley. A 3-D hydrostratigraphic model (MGMG Open-File 703) allows access to lithologic information for any location in the valley.
- Personnel:** James Rose, Principal Investigator

Hamilton Area Ravalli County

- Purpose:** Provide detailed hydrogeologic information that can be used to examine the effects of land use changes on groundwater and surface-water. Evaluate nitrate concentrations as an indication of residential growth and associated increase in septic systems.
- Results:** Irrigation-related recharge to groundwater accounts for one-third of the groundwater budget inflows. Nitrate concentrations varied throughout the study area and were less than the 10 mg/L EPA maximum contaminant level.
- Personnel:** Todd Myse, Principal Investigator

Musselshell River Musselshell County

- Purpose:** Determine the sources of salinity in the lower Musselshell River from Roundup to Melstone. High salinity irrigation water can result in crop yield loss and degraded soils.
- Results:** The high salinity of the Musselshell River in spring is driven by natural increases in groundwater elevation causing an increase in movement of naturally high salinity groundwater to the river. Irrigation mobilized salinity to the river is evident in the late summer and early fall when the river salinity tends to be at its lowest point.
- Personnel:** Liddi Meredith, Principal Investigator

Sidney Area-West Crane Buried Valley Aquifer Richland County

- Purpose:** Determine the availability of water from the buried channel aquifer in the Sidney area and the aquifer's ability to meet the needs for future municipal, irrigation, and oil and gas development.
- Results:** Test drilling defined the extent of the West Crane Aquifer, a buried river valley near Sidney, Montana. The aquifer supports well yields of up to 1,300 gpm. Annual groundwater recharge is highly variable depending on local climatic and seasonal conditions.
- Personnel:** Jon Reiten, Principal Investigator