January 2015

MBMG
Montana Bureau of Mines and Geology

GROUND WATER INVESTIGATION PROGRAM

Montana Bureau of Mines and Geology

ANSWERING COMPLEX, LOCALLY IDENTIFED HYDROLOGIC QUESTIONS ACROSS MONTANA

The ***Ground Water Investigations Program (GWIP)***, in support of science-based water management in Montana, answers site-specific questions that are prioritized and assigned by the Montana Ground Water Steering Committee, as mandated by the Montana Legislature and authorized in MCA 85-2-525. To meet this goal, GWIP conducts research on specific issues in areas that are ranked as the most urgent within the State.

Examples of GWIP topics

- Complex groundwater–surface-water interactions and stream depletion
- Changing aquifer recharge by improved efficiency in irrigation methods
- Hydrologic effects of land-use changes (residential, industrial/municipal, and agriculture)
- Enhanced aquifer storage and recovery
- Water-quality impacts from septic tank density

GWIP and the State Water Plan

Water Supply and Demand

"Ensuring an adequate supply of water to meet current beneficial uses and future demands is a theme echoed by the four Advisory Councils…"

Recommendations from the 2015 State Water Plan:

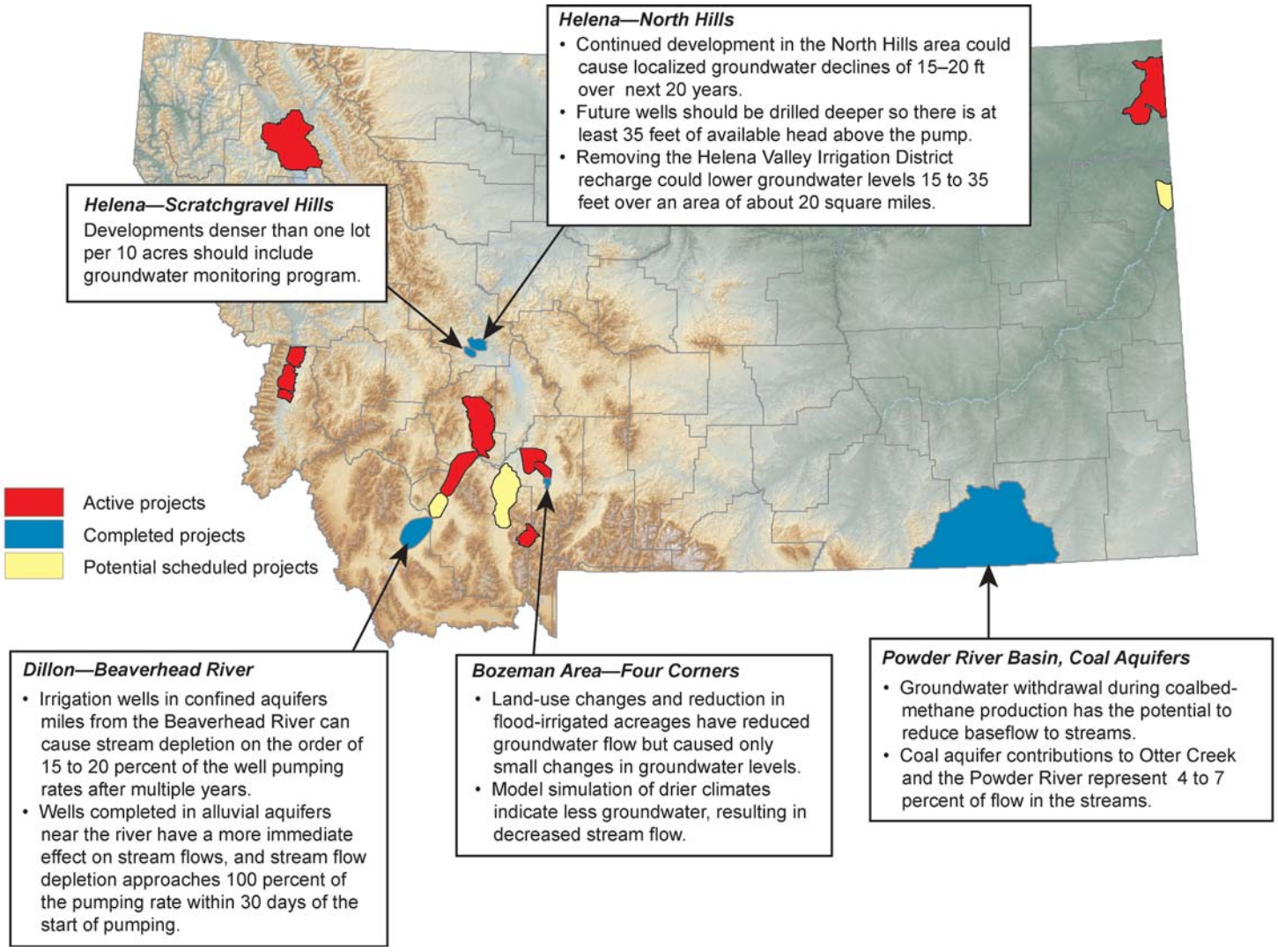
Page 67—*Support site-specific hydrologic investigations to quantify the effects of changing irrigation methods.*
Page 68—*Invest in the capacity to identify and evaluate the large-scale forces that will influence water supply and demand over the next 20 years such as energy development and demographic shifts.*
Page 69—*Investigate the natural storage capacity of wetlands, riparian areas, or floodplains to enhance water management.*
Page 69—*DNRC, stakeholders, and MBMG will investigate the feasibility of aquifer storage and recovery.*
Page 70—*Conduct a climate-variability risk assessment study of threats to the State water.*
Page 73—*Collect aquifer characteristics and water-monitoring data to identify potential groundwater sources for development.*
Page 74—*Support funding for Ground Water Investigation Program to ensure aquifer information and modeling tools are available for conjunctive use management.*
Page 74—*Identify options for mitigation to offset impacts of groundwater use on surface water.*
Page 74—*Investigate the potential for diverting high, spring flows to enhance aquifer recharge.*
Page 74—*Investigate the design of aquifer storage and recovery projects to optimize and protect water.*

Recent Anticipated 2015 Nominations

To date, 50 projects have been nominated to GWIP, and the following 6 are some anticipated nominations during 2015. The Steering Committee has revised the criteria used in selecting studies conducted under GWIP as recommended in the State Water Plan. The criteria will be implemented in 2015.

- ✓Billings area groundwater—a public health concern due to nitrates and pharmaceuticals in groundwater
- ✓Billings area enhanced groundwater recharge though storm water handling systems
- ✓Lolo Creek dewatering relationship with increasing groundwater demands
- ✓Water quality in the Clark's Fork of the Yellowstone River impacting public water supplies or other users
- ✓Fox Hills aquifer declining water levels due to combined historical and new energy demands
- ✓Lewistown public water supply sensitivity analysis of Big Springs and Madison Aquifer

How does GWIP research transfer to water management for Montana?



Results are transferred to the public through reports, presentations, and data:

- 10 detailed, peer-reviewed, MBMG reports have been published, with 4 more in review.
  All MBMG and GWIP reports are available online: http://www.mbmg.mtech.edu/gwip/gwip_reports.asp.
- 4 computer models of site-specific groundwater flow are now available to the public for continued use.
  Modeling files can be downloaded with associated modeling reports.
- Comprehensive set of hydrogeologic data for each site are permanently stored online.
  Available on GWIC: http://mbmggwic.mtech.edu.

Published Reports

Tool to Define Stream Depletion Zones:	A MODFLOW tool to define boundaries of a Stream Depletion Zone, 2014 (MBMG Open-File 655)
Bozeman area:	Groundwater Modeling Report, Four Corners hydrogeologic investigation, near Bozeman,2014 (MBMG Open-File 652)
Helena:	Technical Report, North Hills hydrogeologic investigation area, Helena 2014 (MBMG Open-File 654) Interpretive Report, North Hills hydrogeologic investigation area, Helena, 2013 (MBMG Open-File 628) Groundwater Modeling Report, North Hills hydrogeologic investigation area, Helena, 2013 (MBMG Open-File 610) Technical Report, Scratchgravel Hills hydrogeologic investigation, Helena, 2013 (MBMG Open-File 646) Interpretive Report, Scratchgravel Hills hydrogeologic investigation, Helena, 2013 (MBMG Open-File 636) Groundwater Modeling Report, Scratchgravel Hills hydrogeologic investigation, Helena, 2013 (MBMG Open-File 643)
Dillon:	Interpretive Report, Lower Beaverhead River, Dillon, 2013 (MBMG Open-File 637) Groundwater Modeling Report, Lower Beaverhead River, Dillon, 2013 (MBMG Open-File 638)