GWIP Information

Design of Investigations

The Ground Water Investigation Program (GWIP) arises from the need for detailed information in tributary drainages related to ground-water / surface-water interaction. Informed development of ground-water and surface-water resources requires data related to the hydrologic cycle as well as cumulative effects of current and proposed development.

Ground Water Investigation Program Structure

The objective of the new sub-basin assessment program is to enable the MBMG to compile and collect geologic and hydrogeologic data in targeted sub-basins to provide the State and local government, current water-use applicants, and prospective water-use applicants with an evaluation of the potential effects of ground-water withdrawals on surface water and ground water.

The steering committee (defined later), in cooperation with the MBMG, will select project areas based on current and anticipated growth of agriculture, housing, and/or municipal/commercial activities. Permit applications, both submitted and pending, for subdivision, wells, treatment systems, and aquifer storage recovery, may be used as a basis for selecting project areas. Each project area would be a sub-basin of sufficient extent to represent the detailed hydrogeology of the area identified by the steering committee.

Each sub-basin investigation would include compilation of existing information, field studies, and a detailed hydrogeologic assessment report that may include modeling and a monitoring plan:

- Compilation would include all available geology maps and reports published by State and Federal agencies, academia (theses, journals), and private groups; hydrogeologic assessments and aquifer test data submitted under HB831, past and pending; all available published and unpublished reports and data related to the hydrogeology of the basin or sub-basin. A specific project design would be prepared after compilation of existing data and a review of anticipated development activities.

- Field Studies would be conducted to provide information to assess the impact of the proposed development on ground-water and surface-water quality and quantity. Field activities may include new geologic mapping, aquifer testing and water quality sampling of existing wells, installation of new wells for aquifer testing or sampling, short-term monitoring of water levels and stream flow, surface water-quality sampling, and installation/monitoring of meteorologic stations.

- A detailed hydrogeologic assessment report, including ground-water flow models, for each sub-basin would be published by the MBMG and made available to the public through the MBMG publication website. The MBMG Ground Water Information Center database and website would provide access to all data compiled and collected for each report.

- Each sub-basin study would identify key wells for long-term monitoring and recommend the location of surface water gauging stations appropriate to evaluate the long-term impacts of water-quantity or quality regulation. These data would be used to evaluate net depletions and cumulative depletions, update and re-calibrate ground-water flow models for the area, and will be critical for making decisions related to additional development. The monitoring plan would take advantage of wells and surface water stations installed during the sub-basin assessment as well as those installed during the site hydrogeologic assessments.

The elements of each investigation:

- project duration (1 to 3 years),
- level of effort (budgeting),
- project area (identification of sub-basin),
  [*Drainage basins in western Montana are hundreds to thousands of square miles. For example, the Beaverhead River drainage is about 3500 square miles and the Gallatin River drainage is about 540 square miles. Sub-basins that would be considered for detailed studies are expected to be less than 100 square miles. The current study for HB831 includes about 75 square miles of the lower Beaverhead River sub-basin.*]
- topical areas of interest within each investigation that might include:
  - changes in irrigation practices (reduction, flood to sprinkler, subdivisions)
  - existing and planned/proposed subdivisions
  - changes in land use (gravel pits, reclamation)
  - managed underground storage and recovery (ASR, AR, return flow, etc.)
  - mitigation of surface water depletion
  - special water quality concerns associated with local land use,
- cumulative effects of ground-water and surface-water development and changes,
- water balance for both the principle drainage and tributary drainage, and
- ground-water flow, transport, and/or geochemical modeling as appropriate.

The products of each investigation:

- a detailed technical report of the investigation:
  - geology/geomorphology
  - hydrogeology
  - compilation of previous studies
  - methods/project design
  - results
  - detailed description of model(s) and water balance(s)
  - discussion/summary
- chemistry, aquifer test, water level, well logs, and geology, that will be made available through the MBMG website, and
- model input files. [These files are often large and impractical to make available online; however, the electronic files will be made available on portable mass storage media.]

The steering committee will be the same as that formed for the MBMG Ground Water Assessment Program:

> 2-15-1523. Ground water assessment steering committee. (1) There is a ground water assessment steering committee consisting of an employee of each of the following state agencies that have responsibility for ground water protection, management, or information. The member must be appointed by the head of the respective state agency:
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> (a) the department of natural resources and conservation;
>
> (b) the department of environmental quality;
>
> (c) the department of agriculture; and
>
> (d) the Montana state library, natural resource information system.
>
> (2) The ground water assessment steering committee may include representatives of the following agencies and units of government with expertise or management responsibility related to ground water and representatives of the organizations and groups specified in subsection (2)(h), who shall serve as ex officio members:
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> (a) the legislative services division;
>
> (b) the board of oil and gas conservation;
>
> (c) the Montana bureau of mines and geology;
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> (d) a unit of the university system, other than the Montana bureau of mines and geology, appointed by the board of regents of higher education for the Montana university system;
>
> (e) a county government, appointed by an organization of Montana counties;
>
> (f) a city, town, or city-county government, appointed by an organization of Montana cities and towns;
>
> (g) each principal federal agency that has responsibility for ground water protection, management, or research, appointed by the Montana head of the respective federal agency; and (the USGS and EPA have consistently participated)
>
> (h) one representative of each of the following, appointed by the governor:
>
> (i) agricultural water users;
>
> (ii) industrial water users; and
>
> (iii) a conservation or ecological protection organization.
>
> (3) The ground water assessment steering committee shall elect a presiding officer from its voting members.
>
> (4) The Montana bureau of mines and geology shall provide staff support to the committee.

The steering committee will select and prioritize sub-basins for investigation and provide assistance in the design of each investigation. A working list of potential sub-basin areas is provided; the list is not prioritized, nor inclusive; areas outside closed basins are underlined:

Lower Beaverhead River (in progress)
Helena Valley (North Hills, Scratchgravel Hills)
Gallatin Valley (several sub-basins: Four Corners area, Manhattan-Church Hill, Big Sky, WestYellowstone)
Summit Valley (Butte area)
Lower Bitterroot
<u>Red Lodge</u>
<u>West Billings</u>
<u>Broadview</u>
<u>Horse Creek / Stillwater River</u>
<u>Kalispell</u>

Many other areas of Montana, both in and outside the closed basins, are poised for rapid growth and development of ground water and surface water. It is likely that 1 to 3 new areas will be identified each year.

Infrastructure

The proposed ground water investigation program will be very much dependent on existing programs in the MBMG. The Ground Water Assessment Program (comprised of the Ground Water Information Center [GWIC] database, Ground Water Characterization Program, and Ground Water Assessment Monitoring), the state wide geologic mapping program, individual long-term monitoring programs, and independent investigations comprise a robust infrastructure that has been in place for many years.

Ground Water Information Center (GWIC) database

The GWIC online database is one of the most comprehensive sources of information related to ground water in Montana. Water well location, lithology, and construction are available from this searchable online database. For over 30 years, MBMG projects related to ground water have contributed water quality and water level data to the database that contained data for over 200,000 water wells including more than 35,000 water-quality analyses at about 15,000 sites in Montana.

Ground Water Characterization Program

The need for investigations of large areas encompassing one or more watersheds is met through the existing program. Water balance, well inventory and baseline sampling, water-level and water-quality monitoring at selected sites throughout the area are compiled by the GWCP.

MBMG Long-term monitoring programs

The MBMG has several long-term monitoring programs that include the Ground Water Assessment state-wide monitoring of wells, the Yellowstone Controlled Ground-Water Area monitoring of wells and springs, the Powder River Basin mining and coalbed methane monitoring of wells and springs, and the upper Clark Fork Superfund monitoring of mines, wells, and surface water. The new program will take advantage of these and other monitoring programs conducted other State and Federal agencies, it will contribute short-term monitoring data for each area of investigation, and will provide a monitoring design for each area.

Individual investigations

The MBMG is funded by State (DNRC, DEQ, NRDP) and Federal Agencies (USGS, USFS, BLM, NPS, NRCS) to conduct geologic and hydrgeologic investigations throughout the state. These investigations are often limited in scope and area, but contribute a great deal of information.

STATEMAP geologic mapping program

The MBMG has successfully applied for annual support from the USGS for geologic mapping at various scales throughout Montana. Although the need for very specific mapping of small areas may be needed, the geologic setting of the Montana's watersheds are well documented in geologic maps available through the MBMG - most as digital products.

Program Budget

As noted, the new program would take advantage of the existing programs within the MBMG; however, additional funds are needed for personnel and contracted services including monitoring well drilling. Based on expenditures in recent projects, particularly the Lower Beaverhead sub-basin project funded by HB831, the cost of a two year investigation is estimated at $600,000. The present need is anticipated for 2 to 4 such investigations each biennium.

MUS initiative process / Legislation

Background

The Montana Bureau of Mines and Geology (MBMG) is both a non-regulatory state agency and a department within the Montana University System (MUS) at Montana Tech of The University of Montana (UofM). This relationship with the MUS means that funding changes for the MBMG are usually included in funding changes for the MUS.

Under normal conditions, if the MBMG wants consideration by the Legislature for additional funding, it must participate in the MUS initiative process:

1) The funding initiative is generated by the Director of the MBMG and submitted to the Chancellor of Montana Tech.
2) Upon approval, it is submitted with other Montana Tech and College of Technology initiatives to the President of the UofM.
3) The UofM will submit approved initiatives from the MBMG, Montana Tech, the Montana Tech College of Technology, Western Montana College, The University of Montana and its College of Technology to the Office of the Commissioner of Higher Education (OCHE).
4) Approved initiatives from the entire MUS are submitted to the MUS Board of Regents.

Initiatives that survive the process are included in the MUS budget proposed to the Office of Budget and Program Planning (OBPP). Thus, to comply with MUS procedures, the MBMG in cooperation with WPIC submitted an initiative for a new ground-water investigation program (GWIP) to Montana Tech in December, 2007. The intent is for this initiative to be parallel to potential legislation by WPIC (LC5007).

Status of initiative (2.20.08)

The MBMG met with OCHE on 2.15.08 to discuss the details and status of the GWIP initiative. As of 2.20.08, the initiative will be submitted by UofM to OCHE and presented to the MUS Board of Regents by the President of The University of Montana at its March meeting (5th -7th at UofM-Western, Dillon). The date for the final decision on the initiative has not been announced, but is expected to be at the May meeting.

Issues to date (2.20.08)
Several discussions within the MUS have focused on whether the initiative should be included in the MUS budget or held separate from the MUS budget submitted to OBPP. The decision will affect how the potential funding will accounted for within the MUS budget.