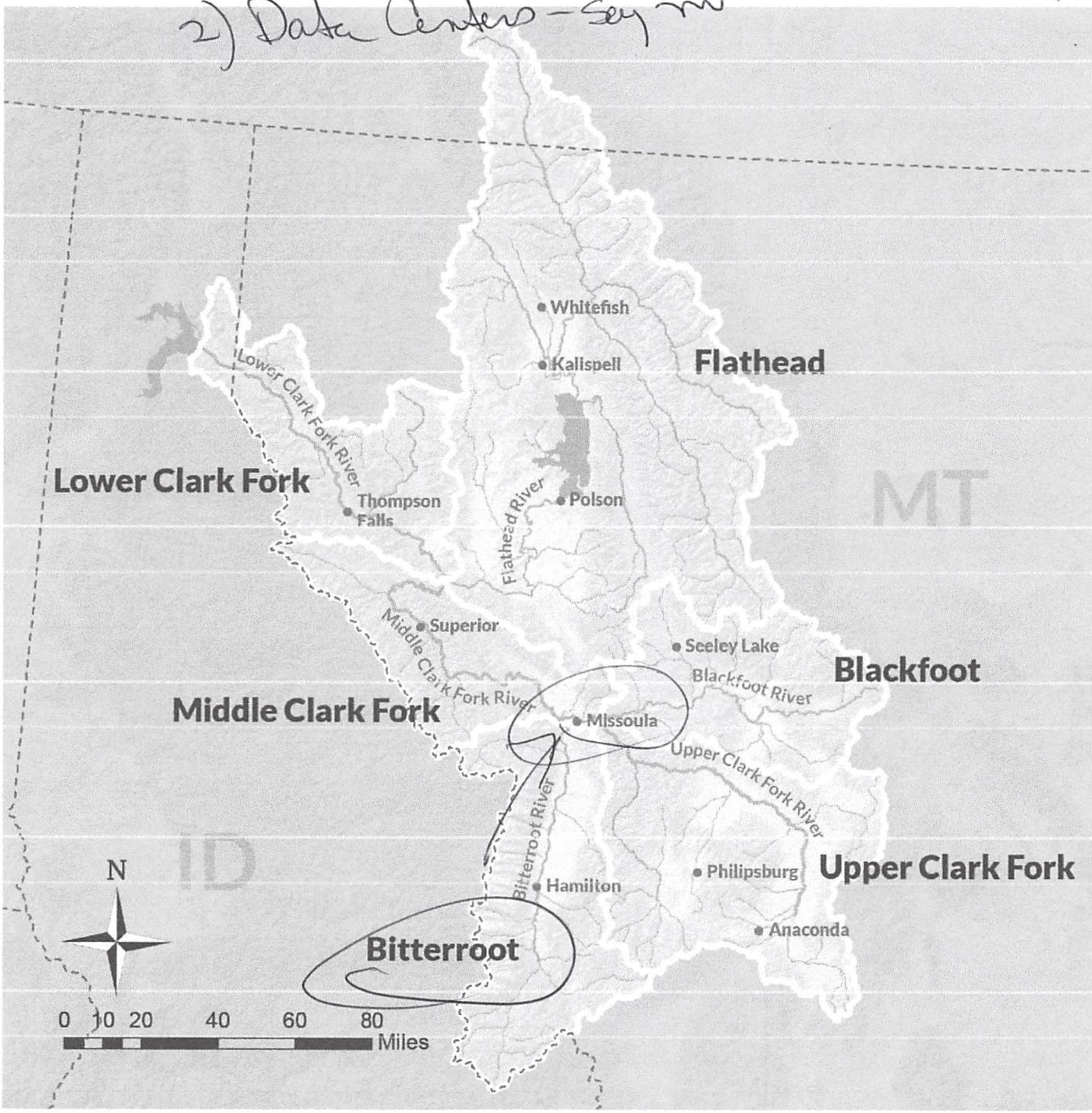
1) Needed - a water study inc. Bitterroot

Rec'd 1-22-24 P. Miller

2) Data Centers - say no



MISSOULA WATER SUPPLY STUDY NEEDED

I'm Peggy M. Miller, 1520 S. 7th st. West, Missoula, homeowner, herb grower, medical herbalist, and once a national water supply/surface/groundwater/water quality "expert", highlandwinds@gmail.com, 406-541-7577.. 1/16/26

We in Missoula County and city, need to know our total Missoula aquifer water supply, so applications by huge consumers like AI Data Centers, that are looking for areas like ours, who can consume water equal to a town of 50,000, and therefore drain local water supply quickly, (and then dump their waste water back into the public supply), can be rejected by town and county officials, but also to know the areas of our aquifer most susceptible to reduction in water table height from increased general population and drought. Our Missoula Aquifer is a sole source aquifer that flows generally north or south by west in direction, from south of Darby, down from Potomac, and east of Missoula to over past Frenchtown and Huson. If a large data center construction application was accepted by the Bitterroot river area, Bonner, or Clinton area, for example, it could rapidly draw down water supply of Missoula, which depends on the Clark Fork, Blackfoot and BitterRoot River watersheds, as major replenishing sources for Missoula needs. The Blackfoot contributes roughly 54% to our aquifer replenishment at Milltown. (see picture). If such a data center were placed at Bonner or in the Bitterroot, Missoula city might find it quickly had very serious water shortages. Globally, communities are starting to contest these data centers who install themselves and then reveal their true water supply needs. They are best located where a desalinization of salt water (oceanside location) is possible.

A comprehensive Missoula Aquifer water study, conducted by USGS, who historically does such work, local and state water engineers and hydrologists, is possible, and in fact pockets of funding from the state might be available. ***In order to get a cost estimate for such an aquifer supply study, and locate funding sources, county and/or city officials need to contact Rodney Caldwell, USGS Helena based hydrogeolost/director of Montana/Wyoming projects:*** (our Missoula hydrogeologists are tapped right now due to ongoing water system study) . Dr. Caldwell agrees there is reason for concern and a study would be highly useful and is accustomed to drawing on knowledge of and working in a coalition framework with specialists around the state.

This Missoula Aquifer Water Supply study should do following at minimum:

a) Prepare an analysis of the size of the Missoula Aquifer that comes up with an approximate estimate of total water supply in Missoula aquifer and estimates population it would serve at current use levels (current resident consumption and irrigation and commercial consumption).

b) Analyzes the areas of our aquifer that are shallow, and so most vulnerable to overtapping, and the presence of underground "walls" from glacier debris that could hamper access of some wells to deeper aquifer draw. This section of study is critical in that future planning of developments, both commercial and residential, requires an understanding of those areas that use the Missoula Aquifer which are facing or approaching a tapping overload so that development placement can be planned.

Rough Description: Subsurface aquifers like the Missoula Aquifer which provides rain/snow/river fed water to our population comprised mainly of the 30 foot deep – 150 foot deep "river of water/ sand" that sits on a semi-impervious bed of shale surrounded on side by bedrock, and such (very compact, with little water) fill easily with good rainfall and snow melt but the subsurface flow of the subsurface water in sand/silt is continuous so it drains quickly if not replenished. Furthermore, the lake-like design of our aquifer edges are shallower but other areas can be unexpectedly shallow also due to unrefined glacier retreat design. Well history helps to track some of this geologic design but much is unknown and needs review due to the dependence we have on this one source of water, particularly as population grows.

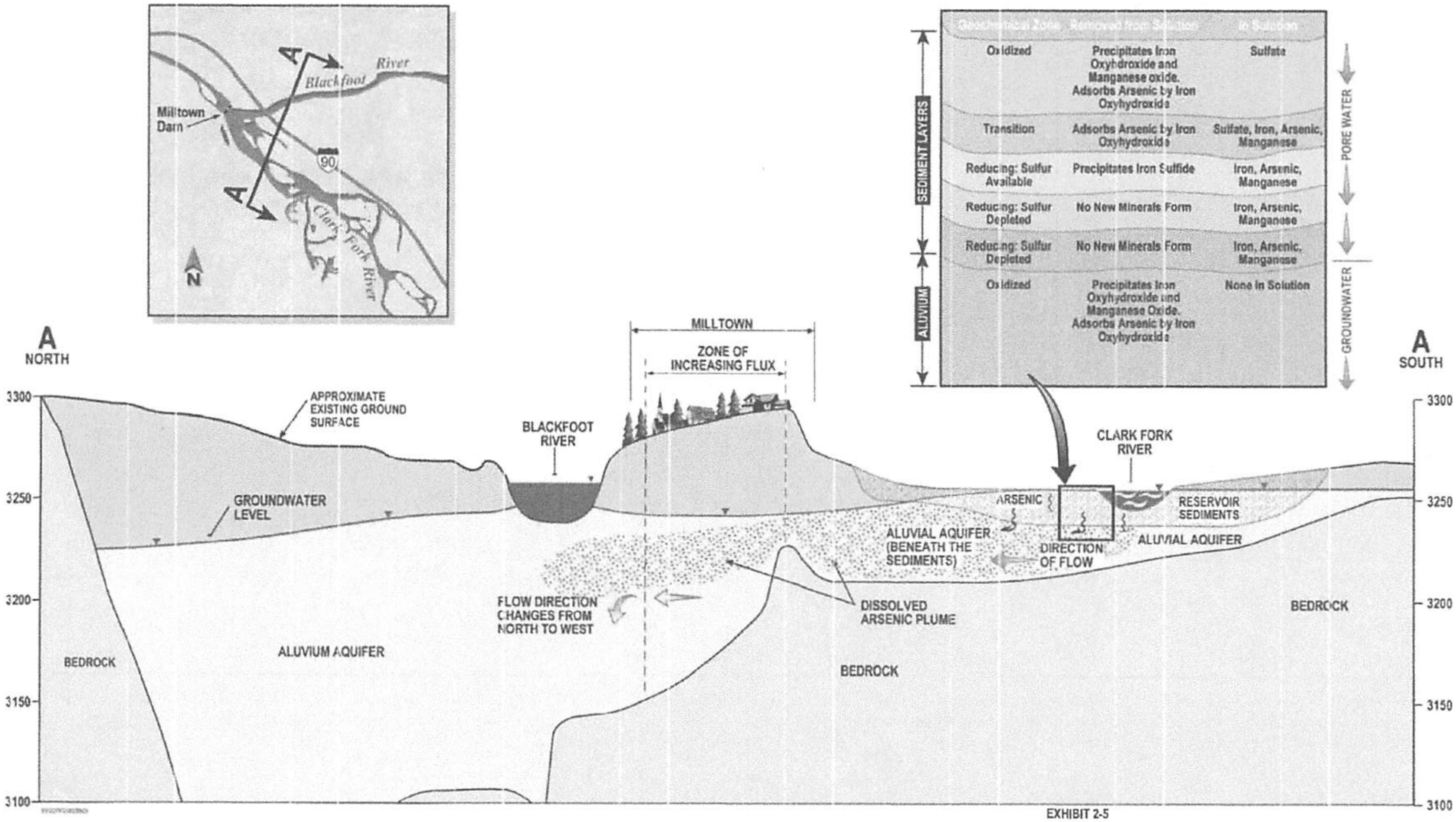


EXHIBIT 2-5
Conceptual Model: Cross-Section of Hydrogeological System and Geochemical Processes in Milltown Reservoir

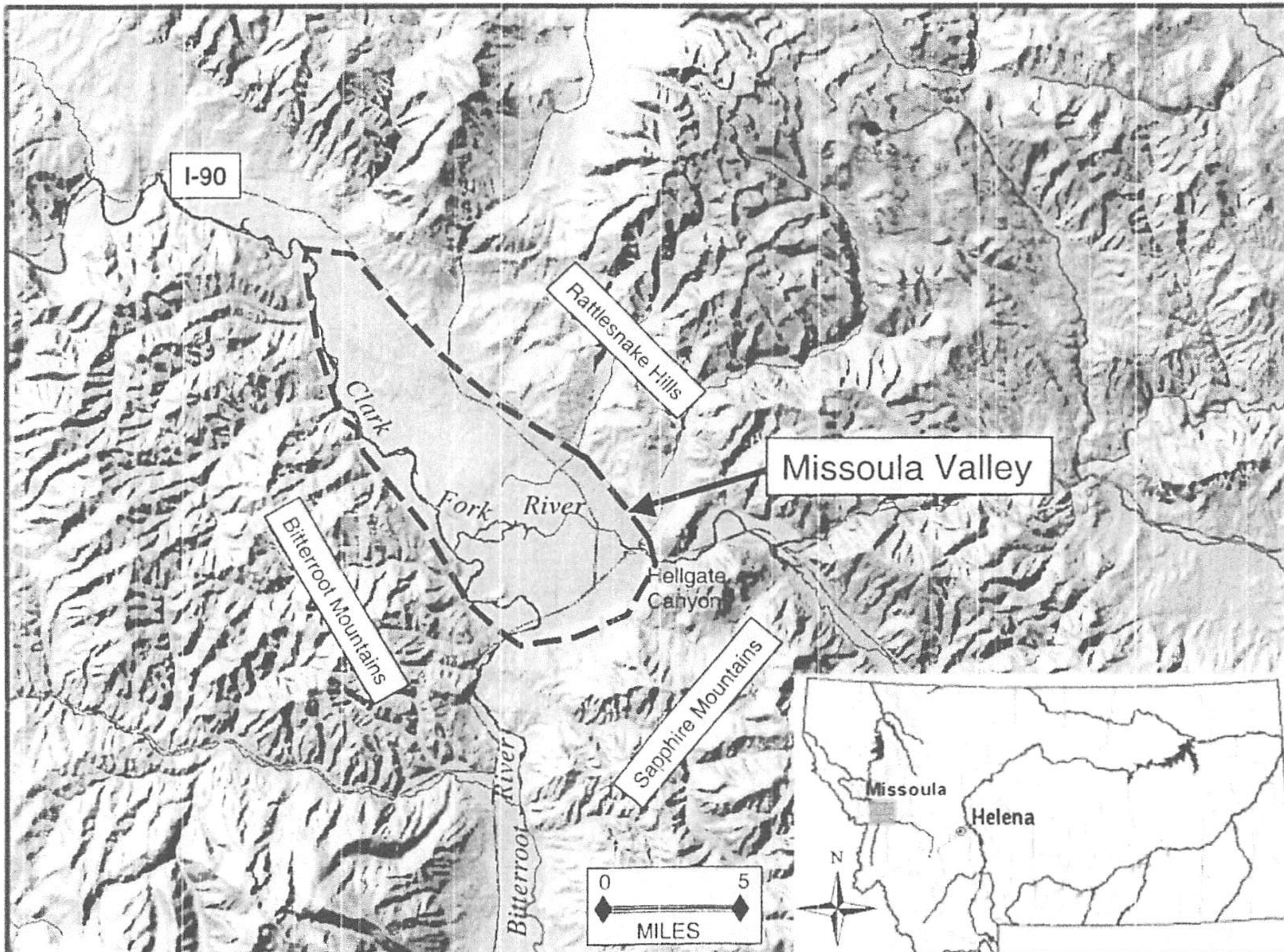


Figure 1. The Missoula Valley is located in southwest Montana near the confluence of the Clark Fork and Bitterroot rivers.

References and quotes: (prep by Peggy M Miller, highlandwinds@gmail.com, 406-541-7577)

Data Center - https://www.columbiariverkeeper.org/2025/stop-data-center-expansion/?gad_source=1&gad_campaignid=21938712625&gbraid=0AAAAACPnzFDdQel_NM_QtcYeJxD413hfK&gclid=CjwKCAiA4KfLBhB0EiwAUY7GATIqavzHHjYPUNX_XqgHaNFIpGR75nwaeJspAXEknrtqK3sJdnWaRhoC95MQAvD_BwE

Big Tech's Data Center Expansion Threatens Columbia and the Climate *By: Kelly Campbell, Policy Director*

High Country News:

The West's data centers suck (water and power)

From simple searches to chatGPT, the big digital buildup threatens the grid and water supplies. Jonathan Thompson *July 28, 2025*

"sustainable" bitcoin mining is an oxymoron, given the enormous amounts of power and water data centers consume. The massive server banks that run nearly every aspect of our digital world churn away in warehouse-like buildings in Phoenix, Las Vegas, rural Washington and Wyoming, each gobbling as much electricity as a small city to process AI queries, cryptocurrency extraction and other aspects of our increasingly cloud-based society. The harder they work, the hotter they get, and the more power and water they need to cool off.

Data Centers – summary (ai)

Data centers use vast amounts of water primarily for cooling servers, with consumption increasing significantly due to AI workloads, leading to local water stress, especially in arid regions, impacting communities and agriculture. While traditional evaporative cooling systems are water-intensive, new technologies like direct-to-chip cooling, closed-loop systems, and locating data centers in cooler climates or using recycled water offer ways to improve efficiency, though overall water usage remains a major sustainability challenge for the industry. (Ai)

How Water is Used

- **Cooling Systems:** Evaporative cooling towers release steam to cool equipment, consuming large volumes of freshwater.
- **Heat Generation:** Servers generate intense heat, requiring constant water supply to maintain operational temperatures.
- **AI's Impact:** AI processing demands more water, with estimates suggesting a single AI query can use a significant amount of water, adding to the strain.

Scale of Consumption

- **Massive Volumes:** Large data centers can use millions of gallons daily, comparable to a small town's water supply. **Corporate Examples:** Google reported using over 5 billion gallons in 2023, with a growing percentage in water-scarce areas. **Local Strain:** In places like Iowa, a single data center's usage can equal several days of residential water supply, and in Georgia, communities face contaminated or depleted sources.

together this data center background brief to share what we've learned with you.

Missoula Aquifer: Tracing Ground-Water Flow in the Missoula Valley Aquifer, Southwest Montana By John I. LaFave , jlafave@mtech.edu Montana Bureau of Mines and Geology Ground-Water Assessment Open-File Report 17 June 2002

"Missoula Valley Aquifer The city of Missoula is underlain by unconsolidated Pleistocene deposits of the Missoula Valley aquifer, a designated sole-source aquifer by the U.S. Environmental Protection Agency (USEPA). Materials in the aquifer were deposited by glacial melt waters and range in size from fine sand and silt to gravel and cobbles. The aquifer is 100 to 150 feet thick and is bounded below by relatively impeimeable, fine-grained Tertiary sediments (figure 4). Three lithologic units have been identified throughout most of the aquifer (Woessner, 1988): the top unit (unit one) is 10 to 30 feet thick, composed of very peimeable coarse sand to boulders; the middle unit (unit two) is as much as 40 feet thick and composed of silt and fine sand and is a low permeability horizon within the aquifer; the basal unit (unit three) is composed of 50 to 100 feet of highly permeable, coarse-grained sand and gravel (figure 5). Unit three is the most prolific zone in the aquifer, wells reportedly yield as much as 4,100 gallons per minute (gpm). Few wells penetrate the base of unit three, so the basal configuration of the aquifer is poorly known. Ground-water in the Missoula Valley aquifer is unconfined, the water table ranges from 10 to 60 feet below the surface. Ground-water flow paths through the aquifer are important because they also describe paths that would likely be taken by contaminants. The potentiometric surface in June 1999 mimics the slope of the land surface; ground water flows from the Clark Fork River southwest toward the Bitterroot River and its confluence with the Clark Fork River; the gradient across the study area was 0.002 (figure 6a). In March 2000, water levels were 5 to 12 feet lower than they were in June 1999 (figure 6b); wells closer to the Clark Fork River show slightly larger declines. The general configuration of the potentiometric was similar to that of June 1999 with the same direction of ground-water flow, although the hydraulic gradient across the study area was slightly smaller. Leakage from the Clark Fork River is estimated to provide 80 to more than 90 percent of the recharge to the aquifer (Woessner, 1988; Miller, 1991); other sources include underflow through Hellgate Canyon, and precipitation. Water leaves the aquifer as discharge to the Bitterroot River, evapotranspiration, and as pumpage from wells. Water levels fluctuate seasonally and are closely tied to discharge in the Clark Fork River (figure 7). Annual water-level fluctuations in wells are on the order of 5 to 10 feet; however, the fluctuations are more pronounced in wells near the Clark Fork River and become muted downgradient along the flow path.

These are results for missoula aquifer contributions of ***bitterroot*** river valley

Search instead for missoula aquifer contributions of bitteroot river valley

AI Overview

The Bitterroot Valley significantly contributes to the larger Missoula aquifer system, primarily through the Bitterroot River, which flows north and joins the Clark Fork, recharging the extensive glacial outwash aquifer beneath the Missoula Valley with vast amounts of groundwater, supplemented by irrigation returns and mountain runoff, creating a massive, shared water resource vital for Missoula's sole-source drinking water supply. This connection means water management in the Bitterroot, especially agricultural practices, directly impacts the quantity and quality of water in the Missoula aquifer, influencing recharge rates and potential contaminants.

How the Bitterroot Valley Feeds the Missoula Aquifer

1. **River Flow & Infiltration**: The Bitterroot River flows north, and its water infiltrates into the ground, recharging the Missoula aquifer along its path through the valley.
2. **Glacial Deposits**: Both valleys are filled with deep glacial deposits (sand, gravel, cobbles) from Glacial Lake Missoula, forming a huge, interconnected aquifer system.
3. **Irrigation Return**: A significant portion of recharge comes from flood irrigation, where water seeps from fields and canals back into the ground.
4. **Mountain Runoff**: Rainfall and snowmelt from the surrounding mountains also contribute to recharge.

Impact on Missoula

- **Sole Source**: The Missoula aquifer, fed partly by the Bitterroot, is Missoula's sole source of drinking water, supplying thousands of households.
- **Connectivity**: Surface water and groundwater in the region are closely linked; changes in the Bitterroot Valley's water use can affect Missoula's supply.

Water Quality & Management Concerns

- **Vulnerability**: The shallow, porous nature of the aquifer makes it susceptible to contamination from stormwater, septic systems, and agricultural runoff.
- **Land Use Matters**: Practices like switching from flood irrigation to sprinklers or lining canals can reduce recharge, impacting the aquifer, notes Bitterroot Star.
- **Nutrient Loading**: Municipal treatment plants in the Bitterroot Valley, like Lolo and Hamilton, add nutrients, highlighting the need for management to protect water quality, according to the Missoula Current.

The Bitterroot River watershed is crucial for Missoula's water, as its flows recharge the **Missoula Valley Aquifer**, the city's sole source of drinking water, with snowmelt and rainfall seeping through glacial deposits, making the river system's health vital for supplying clean water to thousands of residents, alongside other tributaries feeding the larger Clark Fork River system.

Key Contributions & Connections:

- **Aquifer Recharge:** The Bitterroot River and its tributaries (like Lolo Creek) carry water from the surrounding mountains, much of which infiltrates the valley floor to replenish the underground aquifer that Missoula relies on.
- **Clark Fork System:** The Bitterroot River flows north to join the Clark Fork River just north of Missoula, connecting the entire watershed to the larger regional water system that feeds the city.