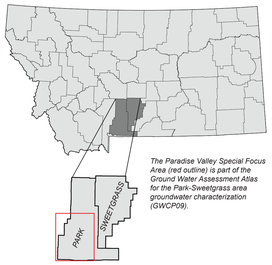
Montana Ground Water Assessment Atlas 9, Map 3

Potentiometric Surface Map and Water–Level Trends in the Upper Yellowstone River Valley

Park County, Montana

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https://doi.org/10.59691/IAYN7202



The Paradise Valley Special Focus Area (red outline) is part of the Ground Water Assessment Atlas for the Park-Sweetgrass area groundwater characterization (GWCP09).

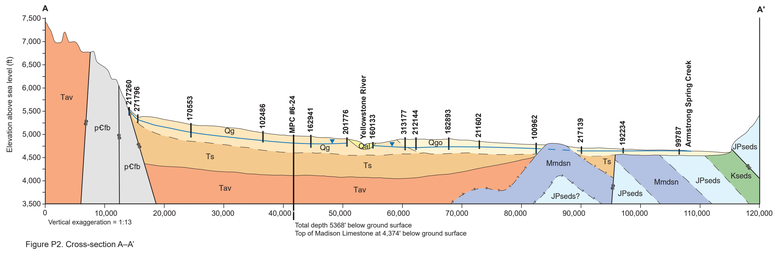


Figure P2. Cross-section A–A'

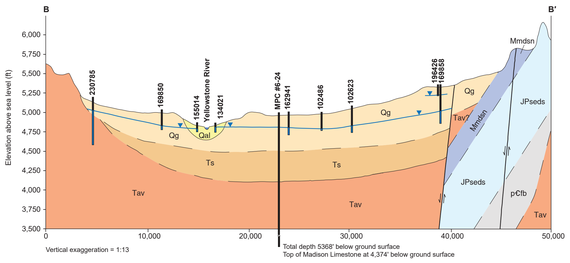


Figure P3. Cross-section B–B'.

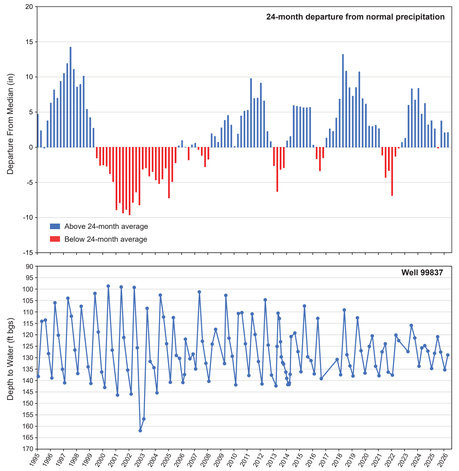


Figure P4. 24-month departure from median precipitation for Park County (WestMap, 2024). Median values were calculated from a 128-year precipitation record (1898–2026) and compared to 24-month totals for each quarter (Jul–Sept; Oct–Dec; Jan–Mar; and Apr–June). Well GWIC 99837 shows response to variations in climate, and shows a slight declining pattern over the past several years.

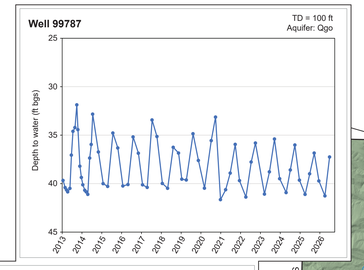


Figure P6. Hydrographs of wells showing the influence of irrigation on recharge patterns. Water levels rise at the onset of peak runoff (early spring), then remain high through the summer and into early fall, reflecting the timing of irrigation activity (canal operations and water applied to irrigated fields in excess of plant uptake). Large-scale irrigation practices are mostly concentrated on the northwest side of the valley, with the biggest effects seen within the glacial outwash aquifer north of the Eightmile terminal moraine (fig. P2).

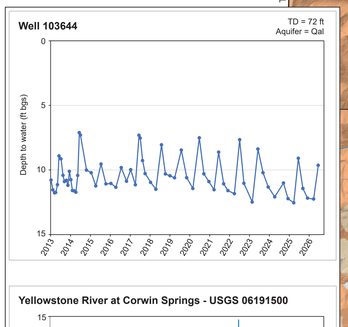
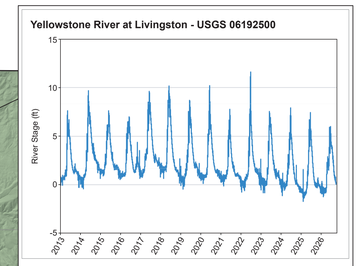
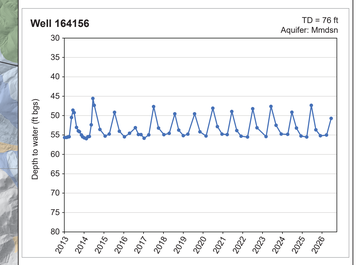
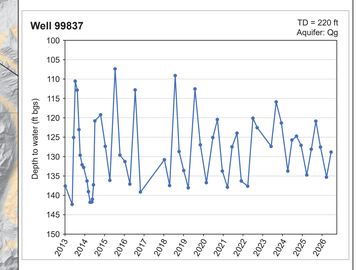


Figure P5. Wells close to the river show seasonal recharge patterns, with water levels peaking in mid-June. Groundwater elevations do not appear to have significant increasing or decreasing patterns over time.

Figure P1. Potentiometric surface map; contours are 100 ft intervals.







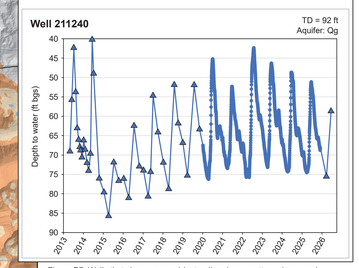
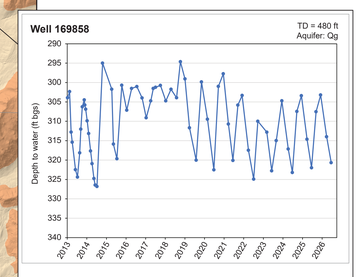


Figure P7. Wells that show seasonal (natural) recharge patterns have peak water-level elevations in late spring/early summer; water levels drop quickly after the spring runoff peaks in the Yellowstone River. Wells 99837 and 211240 appear to respond to climate/precipitation variations, and show slight declining patterns over the past several years.



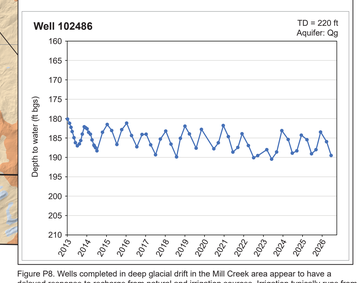


Figure P8. Wells completed in deep glacial drift in the Mill Creek area appear to have a delayed response to recharge from natural and irrigation sources. Irrigation typically runs from late April to September, and peak runoff is typically in mid-June. Recorded water levels in two wells in this area (GWIC 169858 and 102486) show peak water-level elevations in late fall/early winter (November–January; see fig. 6 in the accompanying report for further detail). These wells are completed in deep glacial drift deposits (>200 ft bgs) that contain significant quantities of clay, which may slow down groundwater infiltration and cause the delays in peak groundwater levels observed in this area.

Map Explanation

- Towns
- Roads
- Rivers
- Wells with hydrographs*
- USGS gaging stations
- 4800 Contour lines, dashed where uncertain
- Arrows indicate direction of groundwater flow

Inventoried well and measured elevation of water (ft above sea level)

- Qal
- Qgo
- Qg
- Ts
- Tav
- Kseds
- JPseds
- Mmdsn
- pCfb

Hydrogeologic Units

- Qal—Alluvium
- Qgo—Glacial outwash
- Qg—Glacial drift
- Ts—Tertiary sediments
- Tav—Absaroka volcanics
- Kseds—Cretaceous sedimentary rocks
- JPseds—Jurassic-Paleozoic sedimentary rocks
- Mmdsn—Madison limestone
- pCfb—Precambrian fractured bedrock

**Symbols on the hydrographs indicate water-level measurements. Wells equipped with a transducer display daily average water-level data, except where a "▲" indicates a manual measurement. USGS stream gaging stations are recorded in 15-min increments. A complete record of all MBMG water-level data is available through GWIC, https://mbmggwic.mtech.edu.*

N

0 2.5 5 10 Miles

Scale 1:100,000

Disclaimer: This map is intended to give the user a regional overview of groundwater occurrence and elevation, and aid with initial conceptual models for large-scale investigations. Because this map generalizes sparse data and simplifies local hydraulic gradients, this product may not accurately represent site-specific heads or the presence or absence of actual artesian flow at individual well locations. Readers interested in site-specific interpretations should reevaluate the data with an appropriate contour interval.