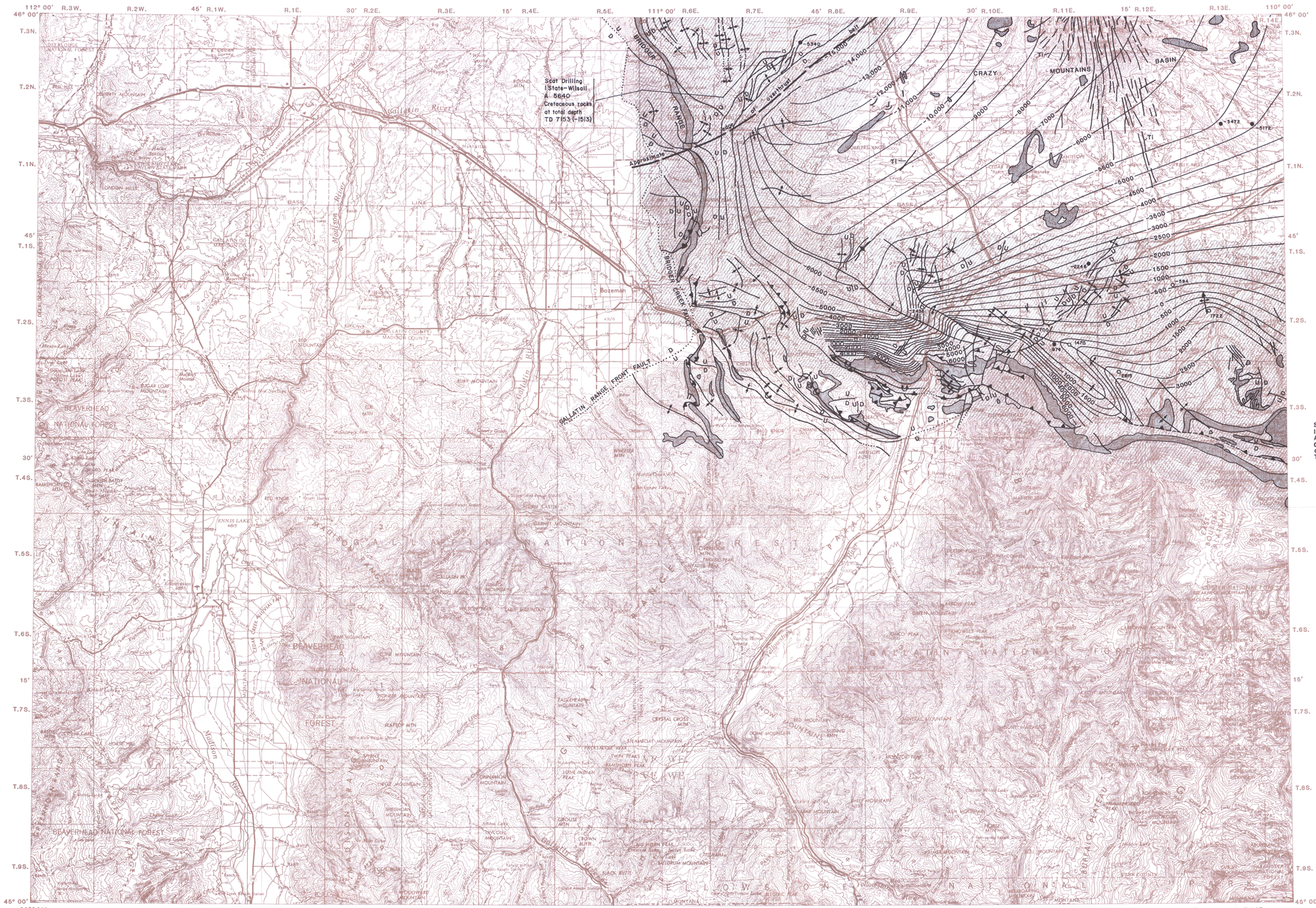
MONTANA BUREAU OF MINES AND GEOLOGY
A Department of Montana College of Mineral Science and Technology

Prepared by the U.S. Geological Survey in cooperation with
MONTANA BUREAU OF MINES AND GEOLOGY

GEOLOGIC MAP SERIES NO. 38
R. D. Feltis, 1985



This map is one of a series that shows the configuration of the top of the Madison Group of Mississippian age at a scale of 1:250,000. The top of the Madison is at the top of the Sun River Member of the Castle Reef Dolomite, Charles Formation, or Mission Canyon Limestone, depending on the geographic area. The maps are part of a preliminary study of the geohydrology of the Madison Group. Other maps show the potentiometric surface (Feltis, 1980a) and the quality of water (Feltis, 1980b,c,d) of the Madison aquifer at a regional scale of 1:1,000,000

EXPLANATION

- Tv/θ / Mississippian: INTRUSIVE ROCKS -- Shows the general outcrop area of dikes, sills, and stocks
- MADISON GROUP -- Shows the general outcrop area of the Madison in the Absaroka, Gallatin, and Bridger Ranges
- CONTACT
- FAULT -- Dashed where approximately located; dotted where concealed. U, upthrown side; D, downthrown side
- THRUST FAULT -- Sawteeth on upper plate. Dashed where approximately located
- OVERTURNED THRUST FAULT -- Sawteeth in direction of dip; bar on side of tectonically higher plate. Dotted where concealed
- AREA OF COMPLEX STRUCTURE -- Indicates area where faulting and folding have complicated the geologic structure. Contours show the general configuration without regard to all the faults or other structural features shown. Delineated structures on the map (from Roberts, 1972, pl. 3) give an indication of the complex areal geology
- ANTICLINE -- Shows crestline and direction of plunge. Dashed where approximately located; dotted where concealed
- OVERTURNED ANTICLINE -- Shows trace of axial plane; dotted where concealed
- SYNCLINE -- Shows trough line. Dashed where approximately located; dotted where concealed
- 1000 — CONTOUR -- Shows altitude of the top of the Madison Group. Contour intervals 500 and 1000 feet. National Geodetic Vertical Datum of 1929 (sea level)

GAS, OIL, OR WATER WELL DATA-COLLECTION SITE

- -5340 ● Well penetrated Madison Group. Number is altitude of top of Madison Group, in feet above or below (-) National Geodetic Vertical Datum of 1929
- -594 ○ Well did not reach Madison Group. Number is estimated altitude of top of Madison Group, in feet above or below (-) National Geodetic Vertical Datum of 1929
- Scat Drilling / I State—Wilsall / A 5640 / Cretaceous rocks at total depth / TD 7153 (-1513) — Well that did not reach Madison Group and altitude was not estimated. First entry, company providing data. Second entry, well name. A, altitude of measuring point at land surface (in feet above National Geodetic Vertical Datum of 1929). Fourth entry, geologic section penetrated. TD, total well depth (in feet below measuring point); number in parentheses is altitude of bottom of hole (in feet below National Geodetic Vertical Datum of 1929)

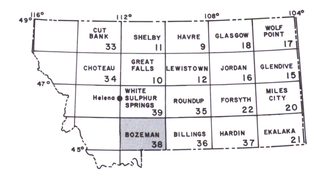
REFERENCES

Feltis, R. D., 1980a, Map showing potentiometric surface of water in the Madison Group, Montana: Montana Bureau of Mines and Geology Hydrogeologic Map 2, 1 sheet, 1:1,000,000.

_____1980b, Map showing dissolved-solids concentration of water in the Madison Group, Montana, *in* Dissolved-solids and ratio maps of water in the Madison Group, Montana: Montana Bureau of Mines and Geology Hydrogeologic Map 3, 1 sheet, 1:1,000,000.

_____1980c, Map showing ratio of sodium, potassium, and chloride to dissolved-solids concentration in water of the Madison Group, Montana, *in* Dissolved-solids and ratio maps of water in the Madison Group, Montana: Montana Bureau of Mines and Geology Hydrogeologic Map 3, 1 sheet, 1:1,000,000.

_____1980d, Map showing ratio of sulfate to total anions in water of the Madison Group, Montana, *in* Dissolved-solids and ratio maps of water in the Madison Group, Montana: Montana Bureau of Mines and Geology Hydrogeologic Map 3, 1 sheet, 1:1,000,000.



INDEX TO 1:250,000 SCALE MAPS IN THIS SERIES
Published maps indicated by report number

Limits of boundaries of outcrop and location of structural elements are from the following reports:

Bonini, W. E., Kelley, W. N., Jr., and Hughes, D. W., 1972, Gravity studies of the Crazy Mountains and the west flank of the Beartooth Mountains, Montana, *in* Montana Geological Society Guidebook 21st Annual Geological Conference, Crazy Mountains Basin, September 1972: p. 119-127.

Dobbin, C. E., and Erdmann, C. E., 1955, Structure contour map of the Montana plains: U.S. Geological Survey Oil and Gas Investigations Map OM-178A.

Foose, R. M., Wise, D. U., and Garbarini, G. S., 1961, Structural geology of the Beartooth Mountains, Montana and Wyoming: Geological Society of American Bulletin, v. 72, no. 8, p. 1143-1172.

Garrett, H. L., 1972, Structural geology of the Crazy Mountains Basin, *in* Montana Geological Society Guidebook 21st Annual Geological Conference, Crazy Mountains Basin, September 1972, p. 113-118.

Jones, W. R., Peoples, J. W., and Howland, A. L., 1960, Igneous and tectonic structures of the Stillwater Complex, Montana: U.S. Geological Survey Bulletin 1071-H, p. 281-340.

Richards, P. W., 1957, Geology of the area east and southeast of Livingston, Park County, Montana: U.S. Geological Survey Bulletin 1021-L, p. 385-438.

Roberts, A. E., 1972, Cretaceous and early Tertiary depositional and tectonic history of the Livingston area, southwestern Montana: U.S. Geological Survey Professional Paper 526-C, 120 p.

Base from U.S. Geological Survey
1958. Revised 1972

SCALE 1:250 000
5 0 5 10 15 20 25 MILES
5 0 5 10 15 20 25 KILOMETERS
TOPOGRAPHIC CONTOUR INTERVAL 200 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Contours mapped during December 1983

MAP SHOWING CONFIGURATION OF THE TOP OF THE MADISON GROUP, BOZEMAN 1-DEGREE BY 2-DEGREE QUADRANGLE, MONTANA

By
R. D. Feltis
1985