

Geology mapped in 1976. Faults from
M. R. Mudge, U.S. Geological Survey,
unpub. mapping

PRELIMINARY MAP SHOWING SURFICIAL DEPOSITS IN THE SOUTHWEST QUARTER OF THE SWAN LAKE QUADRANGLE, LAKE AND FLATHEAD COUNTIES, MONTANA

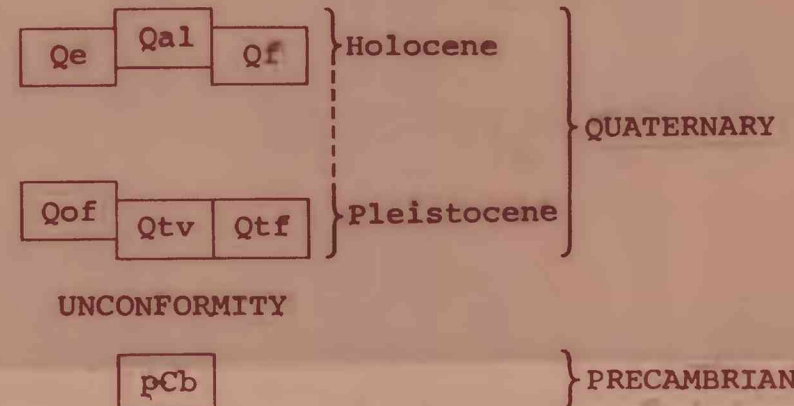
By
Irving J. Witkind
1978

Introduction

U.S. Geological Survey personnel, in conjunction with Mark Weber, Geologic Consultant to Missoula and Powell Counties, are studying the water and earth resources of an area that extends from the Big Fork quadrangle on the north to the Avon quadrangle on the south (see index map). This map is a product of that study, and is intended for use by environmental and land-use planners. Maps of quadrangles, or parts of quadrangles, south of Highway 200, have been prepared by Weber.

The distribution of the alluvium was plotted in the office from aerial photographs. All other geologic units were mapped in the field.

CORRELATION OF MAP UNITS



Surficial deposits

Surficial deposits in the northern part of the Big Fork-Avon area were formed primarily during the latter stages of the latest ice age--the Pinedale glaciation of the Pleistocene. Glacial deposits mantle the lower flanks of the mountains and form the valley floors; they have been dissected somewhat by streams, but most still appear much as when they were deposited. In some localities, deposits of more than one ice advance may have been inadvertently grouped and thus mapped as the deposits of a single advance.

DESCRIPTION OF MAP UNITS

- Qal ALLUVIUM (HOLOCENE)--light-gray to gray, stream-deposited, unconsolidated silt, sand, and gravel. Forms the floor of Swan River. Locally includes small deposits of colluvium and other mass-wasting debris. Clasts range in shape from subangular to well rounded; most are rounded. In general, about 85 percent of unit is composed of clasts that range in size from about 5 mm to about 76 mm (1/4-3 in.) in diameter; about 13 percent consists of a fine to coarse sand with included small pebbles as much as 5 mm; and the remaining 2 percent is silt. Includes some cobbles as much as 20 cm (8 in.) across. Green, gray, and purple argillite, tan dolomite, and bluish-gray limestone clasts dominate. Overlies and masks sand and gravel deposited by meltwaters of former glaciers
- Qf ALLUVIAL FAN (HOLOCENE)--light-brown to brown, broad, fan-shaped, gently sloping, even-surfaced deposit of poorly sorted debris at the mouths of mountain valleys. Consists of angular to subrounded fragments of argillite, siltite, sandstone, and dolomite derived from bedrock exposed in the mountains to the east
- Qe EARTHFLOW(?) (HOLOCENE)--Brown to dark-brown, elongate, uneven-surfaced, moderately sloping mass of partly consolidated, unsorted silt, sand, gravel, cobbles, and boulders in a clayey matrix. In places, surface is marked by ridges that parallel elongate direction of flow movement. Probably formed when partly liquified till moved downslope
- MELTWATERS OF PINEDALE GLACIATION (PLEISTOCENE)
- Qof Outwash fan--Broad, fan-shaped deposit of light-gray to gray, unconsolidated, moderately well sorted silt, sand, gravel, and cobbles at mouth of outwash channel. Clasts range from subrounded to well rounded; most are rounded. In general, about 85 percent of unit is composed of clasts that range in size from about 5 mm to about 76 mm (1/4-3 in.) in diameter, about 13 percent consists of a fine to coarse sand with included small pebbles as much as 5 mm; and the remaining 2 percent is silt. Green, gray, and purple argillite, and bluish-gray limestone clasts dominate deposit

TILL OF PINEDALE GLACIATION (PLEISTOCENE)

- Qtv Valley facies--Brown to dark-brown; coarse; consists of a heterogeneous mixture of gravel, cobbles, and boulders in a partly consolidated silty to clayey matrix. Clasts range in shape from angular to well rounded; most are rounded. Includes many rounded cobbles 8-20 cm (3-8 in.) in diameter, and many subrounded to rounded boulders 0.3-1 m (1-3 ft) across. Clasts of green, gray, and purple argillite dominate. Many large angular to subangular boulders 2.4-3 m (8-10 ft) across, are scattered through the till and on the surface. Characterized by a subdued knob-and-kettle topography marked by a few small kettle lakes and swamps. Some aligned drumlinoid knobs and ridges trend about N. 35° W. which suggests a general northwest direction of movement of trunk glacier that overrode this till.
- Till was deposited by a glacier that flowed northeastward from ancestral Lindbergh Lake Valley (south of this quadrangle) into the ancestral valley of Swan River
- Qtf Foothill facies--Light-brown to brown; consists of an unsorted mixture of gravel, cobbles, and boulders in a silty to clayey matrix. Clasts range in shape from angular to subrounded; most are subangular. Most clasts range from 0.1 to 6 cm (1/2-2 1/2 in.) across. Clasts of green, gray, and purple argillite, of tan dolomite, and of tan quartzite and sandstone appear to be equally abundant. Boulders 0.4-4.5 m (2-15 ft) across are common. Forms a thin to thick veneer over bedrock; extensively mantled by colluvium.
- Source of this till is unknown; likely it was deposited by an older glacier that flowed north in ancestral Swan River valley prior to the advent of the younger glacier responsible for the drift that now mantles most of the valley floor. The direction of movement of this older glacier, however, may have been southward up the ancestral Swan River valley

- pGb BEDROCK OF BELT SUPERGROUP, UNDIVIDED (PRECAMBRIAN)--Consists of several units of the Belt Supergroup, chiefly the Spokane (argillite and siltite), Empire (argillite and siltite), and Helena (dolomite) Formations. These are "bright" units in varying shades of red, purple, green, tan, and gray

CONTACT--Approximately located or inferred. In many places wholly or partly concealed by debris or dense foliage

FAULT--Dashed where approximately located or inferred; dotted where concealed. U, upthrown side; D, downthrown side

Index map showing quadrangles in the Big Fork-Avon area. The Swan Lake quadrangle is shaded. Preliminary surficial geologic maps of the following quadrangles, by I. J. Witkind, are available as U.S. Geological Survey Open-File Reports from the:

Open-File Services Section,
Branch of Distribution,
Box 25425, Federal Center,
Denver, Colorado 80225

Copies of the maps can be examined at the following offices:

Denver Public Inquiries Office,
U.S. Geological Survey,
1012, Federal Building,
1961 Stout Street, Denver, Colorado 80202

Salt Lake City Public Inquiries Office,
U.S. Geological Survey,
8015, Federal Office Building,
125 South State Street
Salt Lake City, Utah 84111

Spokane Public Inquiries Office,
U.S. Geological Survey,
678, U.S. Courthouse Building,
West 920 Riverside Avenue,
Spokane, Washington 99201

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|------------------------------|--------|
| 1. Gilly Creek | 77-860 |
| 2. Condon (W. half) | 77-540 |
| 3. Coopers Lake (S. half) | 77-466 |
| 4. Cygnet Lake | 77-198 |
| 5. Holland Lake (W. half) | 77-199 |
| 6. Lake Inez | 77-200 |
| 7. Ovando | 77-196 |
| 8. Ovando Mountain (S. half) | 77-465 |
| 9. Peck Lake (E. half) | 77-539 |
| 10. Salmon Lake | 77-197 |
| 11. Salmon Prairie | 77-861 |
| 12. Seeley Lake East | 77-202 |
| 13. Seeley Lake West | 77-201 |
| 14. Swan Lake (SW quarter) | 78-135 |
| 15. Woodworth | 77-203 |
| 16. Yew Creek (NE quarter) | 78-136 |