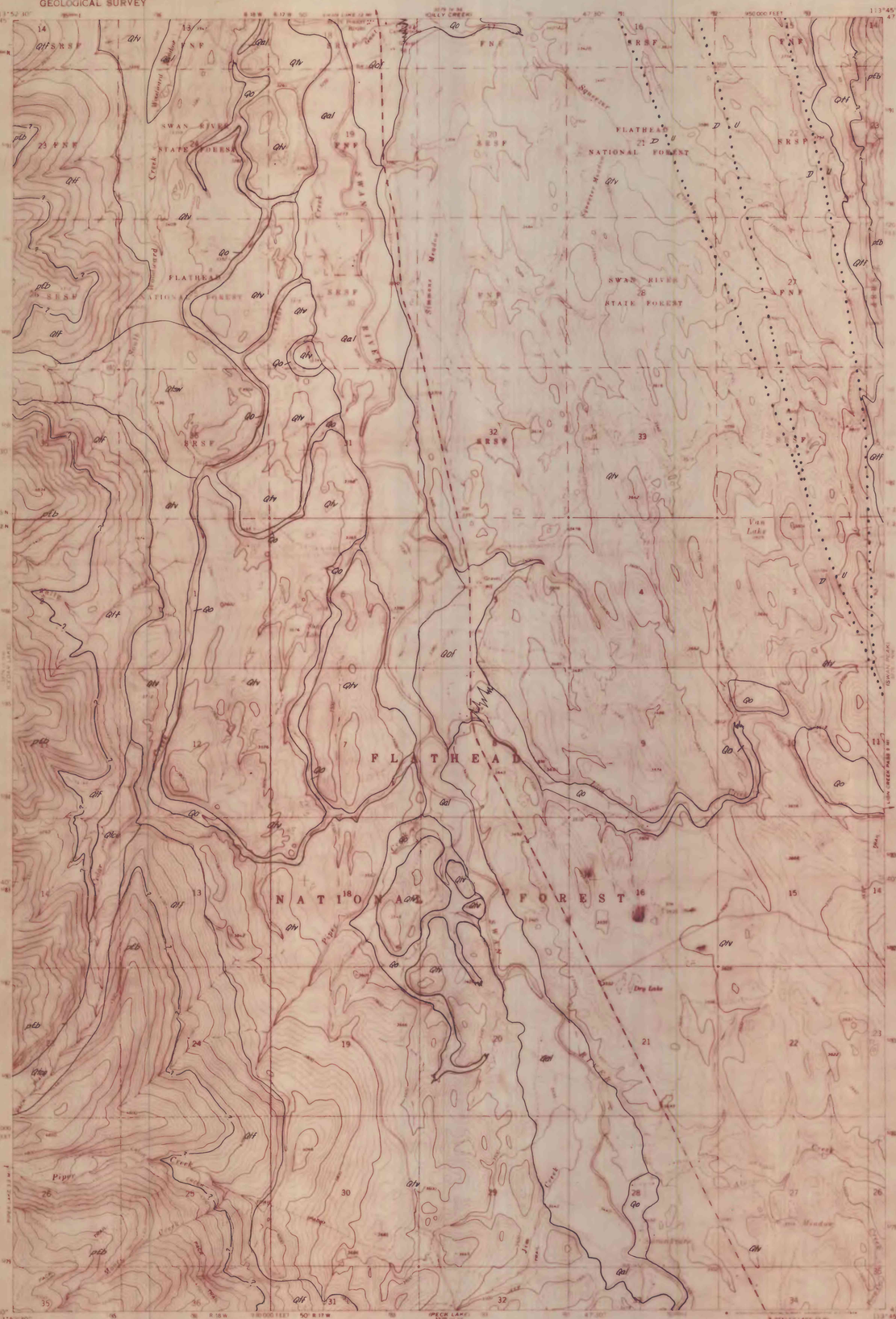
OPEN-FILE REPORT

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



Base from U.S. Geological Survey, 1965

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 10-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

UTM GRID AND 1965 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

QUADRANGLE LOCATION

Geology mapped in 1976.
Faults from M. R. Mudge, unpub. mapping.

SALMON PRAIRIE, MONT.
N4737.5—W11345/7.5
1965
AMS 3274 II NE—SERIES V881

PRELIMINARY MAP SHOWING SURFICIAL DEPOSITS IN THE SALMON PRAIRIE QUADRANGLE, LAKE COUNTY, MONTANA

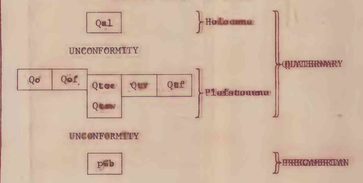
Irving J. Witkind

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 200N, have been prepared by Weber.

The distribution of 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 part 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 formed. In some localities, deposits of more than one ice advance may have been included in one or the other category.

Deposits of former tributary glaciers locally extend into the Swan Valley. These deposits are mapped separately and are identified by appropriate symbols; thus, "Qtsw" is "till deposited by Cedar Creek ice."

DESCRIPTION OF MAP UNITS

Qal ALLUVIUM (HOLOCENE)--Stream-deposited unconsolidated silt, sand, and gravel. Forms the floor of Swan River. Locally includes small deposits of colluvium and other mass-wasting debris. Light brown to brown; clasts range in shape from subangular to well rounded; most are rounded. In general, about 72 percent of unit is composed of clasts that range in size from about 5 mm to 76 mm (1/4-3 in.) in diameter; about 26 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, tan dolomite, and bluish-gray limestone clasts dominate. Overlies sand and gravel deposited by meltwaters of wasting glaciers

MELTWATERS OF PINEDALE GLACIATION (PLEISTOCENE)

Qo Outwash--Includes three kinds of deposits. The first, represented by a small patch of outwash along Swan River Valley (near the south edge of the quadrangle), is a remnant of a once-continuous deposit originally formed by north-flowing meltwater of a wasting trunk glacier which occupied ancestral Swan Valley. The patch consists of light-brown to brown, unconsolidated, moderately well sorted silt, sand, and gravel covered by very fine grained sand 5-60 cm (2-24 in.) thick. Clasts range in shape from subangular to subrounded; most are subrounded. In general, about 80 percent of the unit is composed of clasts that range in size from about 5 mm to 76 mm (1/4-3 in.) in diameter; about 19 percent consists of a fine to coarse sand with included small pebbles as much as 5 mm; and the remaining 1 percent is silt. Green, gray, and purple argillite clasts strongly dominate the deposit; tan quartzite and sandstone clasts are minor constituents. A second kind of deposit partly fills narrow, sinuous, interrelated outwash channels. These deposits are mantled in great part by alluvium, colluvium, and other mass-wasting debris. Outwash consists of light-brown to brown, unconsolidated to partly consolidated, poorly sorted silt, sand, and gravel. Clasts range in shape from angular to rounded; most are subrounded. Sizes range from about 0.5 to 20 cm (1/4-8 in.); most are about 5 cm (2 in.) in diameter. Clasts of green, gray, and purple argillite predominate; tan quartzite and sandstone clasts are minor constituents. These channels were formed by meltwater which flowed in and around isolated blocks of a wasting glacier. The third kind of deposit appears as three discrete masses of sand and gravel along Lion Creek. These were formed by meltwater which flowed westward from the valley of Lion Creek (east of this quadrangle). Deposits are dark brown to grayish brown, unconsolidated, and moderately well sorted. Clasts range in shape from angular to well rounded; most are subangular. In general, about 17 percent of unit is composed of clasts that range in size from about 5 mm to 76 mm (1/4-3 in.) in diameter; about 73 percent consists of a fine to coarse sand with included small pebbles as much as 5 mm; and the remaining 10 percent is silt and clay. Green, gray, and purple argillite clasts dominate deposit. Gray diorite fragments are common

QoF Outwash fan--Broad, fan-shaped deposits of brown to dark-brown, unconsolidated, moderately well sorted silt, sand, gravel, and cobbles at mouth of outwash channels. Clasts range in shape from angular to well rounded; most are rounded. In general, about 72 percent of unit is composed of clasts that range in size from about 5 mm to 76 mm (1/4-3 in.) in diameter; about 26 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 clasts dominate deposit; tan quartzite and sandstone clasts are minor constituents

PINEDALE TILL (PLEISTOCENE)

Qtv Swan Valley facies--Characterized by a striking knob-and-kettle topography marked by numerous small kettle lakes and swamps. Many small alined drumlins that trend about N. 15° W. suggesting general northwest direction of movement of trunk glacier that deposited and overrode this till. Brown to reddish brown, very coarse; consists of a heterogeneous mixture of unconsolidated gravel, cobbles, and boulders in a matrix of medium to coarse sand. Locally matrix becomes somewhat clayey. Clasts range in shape from angular to well rounded; most are rounded. In general, about 60 percent of the unit is composed of clasts that range in size from about 5 mm to 76 mm (1/4-3 in.) in diameter; about 25 percent consists of a fine to coarse sand with included small pebbles as much as 5 mm; and the remaining 15 percent is silt. Includes many well-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. This 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. Smaller glaciers emerging from valleys along the east flank of the Mission Range, such as the valleys of South Woodward and Cedar Creeks, flowed into this trunk glacier

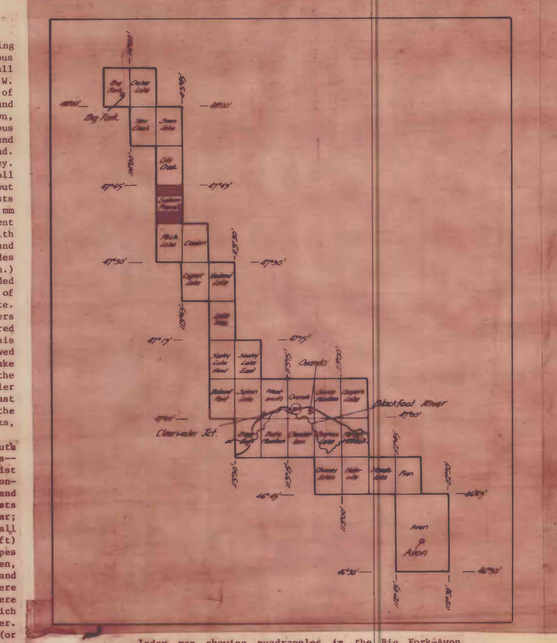
Qtsw, Qtce Till deposited by glaciers in valleys of South Woodward (Qtsw), and Cedar (Qtce) Creeks--These deposits are much alike. They consist of an unsorted, unconsolidated to partly consolidated mixture of gravel, cobbles, and boulders in a sandy to clayey matrix. Clasts range in shape from angular to subangular; most are angular. Sizes range from small pebbles to boulders as much as 4.6 m (15 ft) across. In general, the same lithologic types are in both tills, chiefly clasts of green, gray, and purple argillite, tan dolomite, and tan sandstone and quartzite. These tills were deposited by small glaciers that were tributary to the main trunk glacier which occupied the ancestral valley of Swan River. A distinctive small lobate terminal (or recessional) moraine at the mouth of the valley of South Woodward Creek extends into the main Swan River Valley. The general pattern of drumlinoid hills around the east edge of the moraine suggests that the trunk glacier flowed around it

Qtf Foothill facies--Forms a thin to thick veneer over bedrock; extensively mantled by colluvium. 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 profuse. Boulders 0.5-4.5 m (2-15 ft) across are common. 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. It may have been deposited, however, by an older glacier that flowed southward up the ancestral Swan River Valley

pЄb 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--Dotted where concealed; approximately located or inferred. U, upthrown side; D, downthrown side



Index map showing quadrangles in the Big Fork-Avon area. The Salmon Prairie 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 following office:

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

1.	Silly 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.	Woodworth	77-203