Montana Bureau of Mines and Geology
Open File No. 408

Geologic Map of the Lima 30' x 60' Quadrangle, Southwest Montana

J. D. Lonn, B. Skipp, E. T. Ruppel, S. U. Janecke, W. J. Perry Jr, J. W. Sears,
M. J. Bartholomew, M. C. Stickney, W. J. Fritz, H. A. Hurlow, and R. C. Thomas

2000

To view a full scale version of this map, click here.

For the text files with the map information, click here.

Digital data link

Note— This map was originally published at a scale of 1;100,000 but the page sizes have been modified to fit average printer capabilities (8½ x 14; legal size paper). There is a an eighth inch overlap on these pages. A full sized colored print of this map can be ordered from the MBMG Publication Sales Office, 1300 West Park Street, Butte, MT, 59701-8997.

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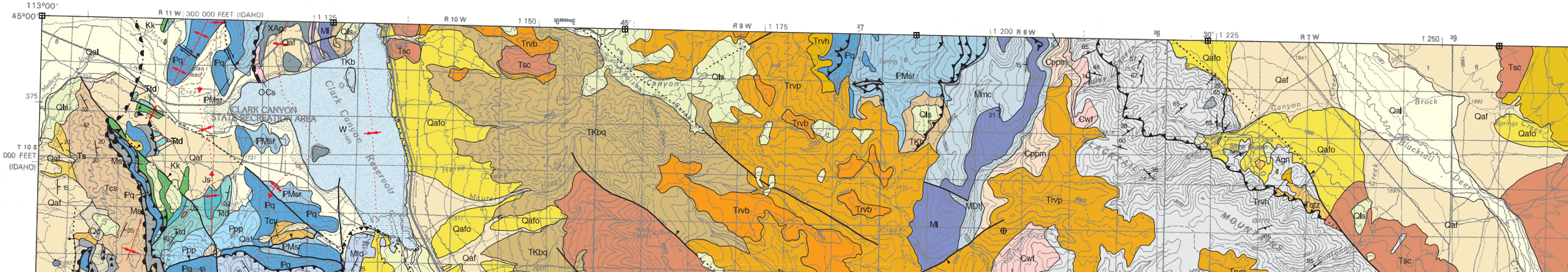
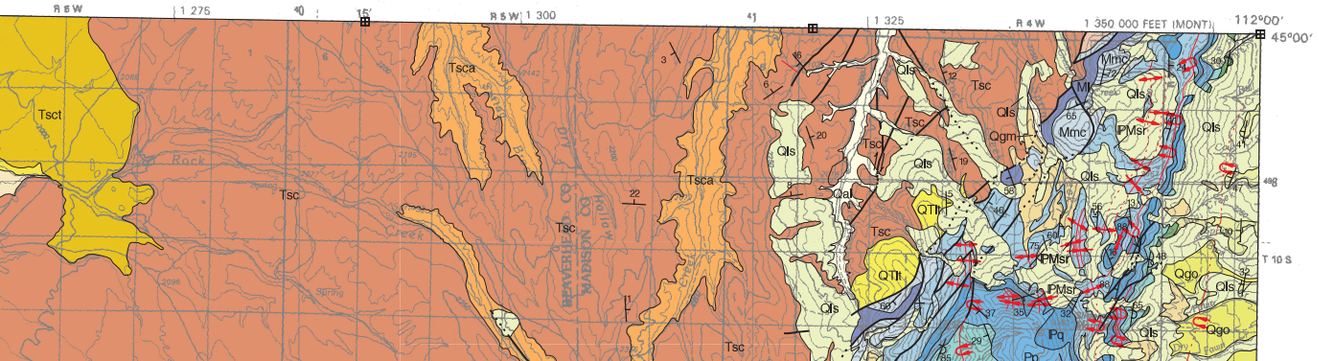
Open File MBMG 408, Plate 1 of 2
Geologic Map, Lima 30'x60' Quadrangle

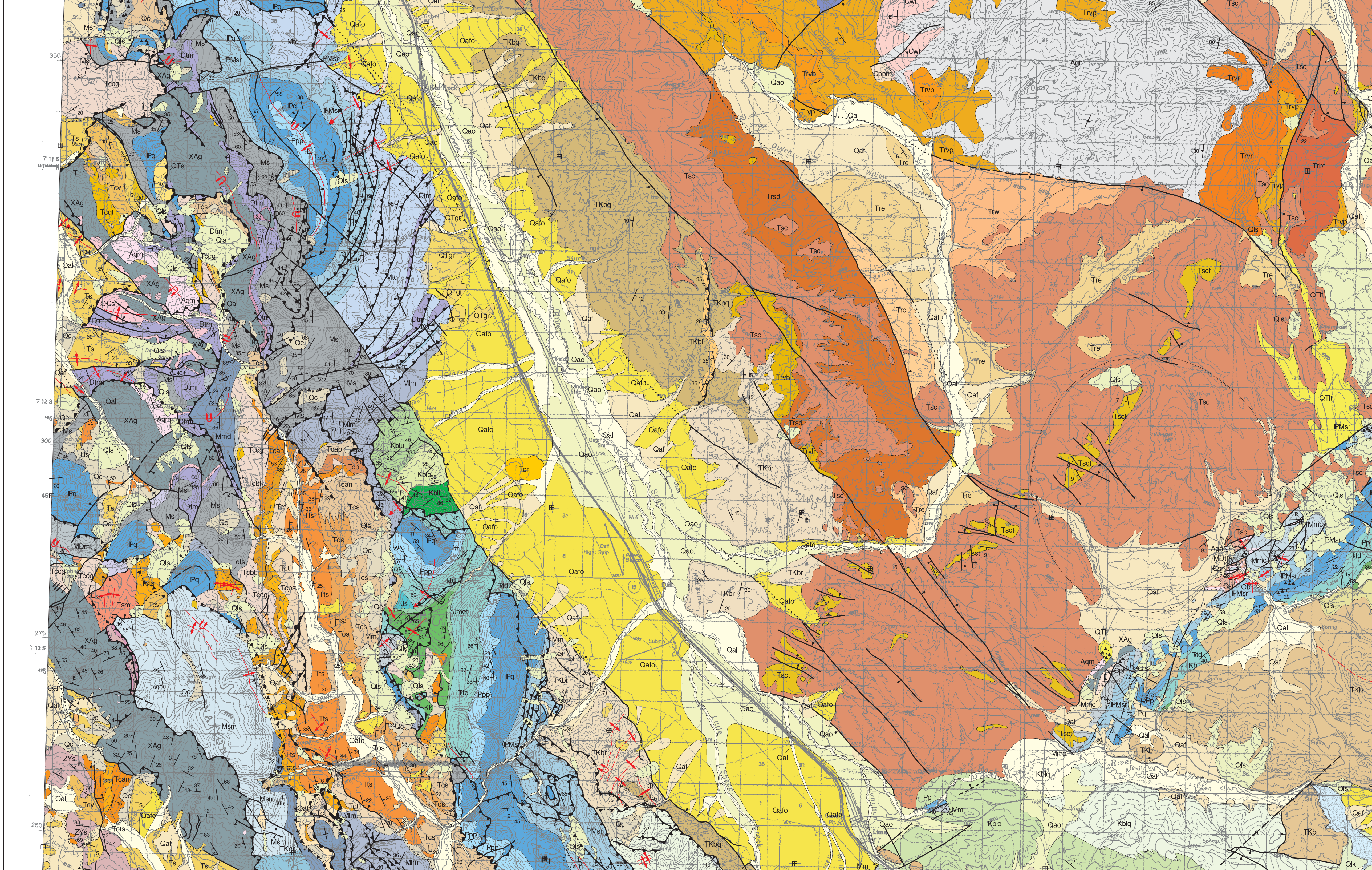


MONTANA BUREAU OF MINES AND GEOLOGY
A Department of Montana Tech of The University of Montana

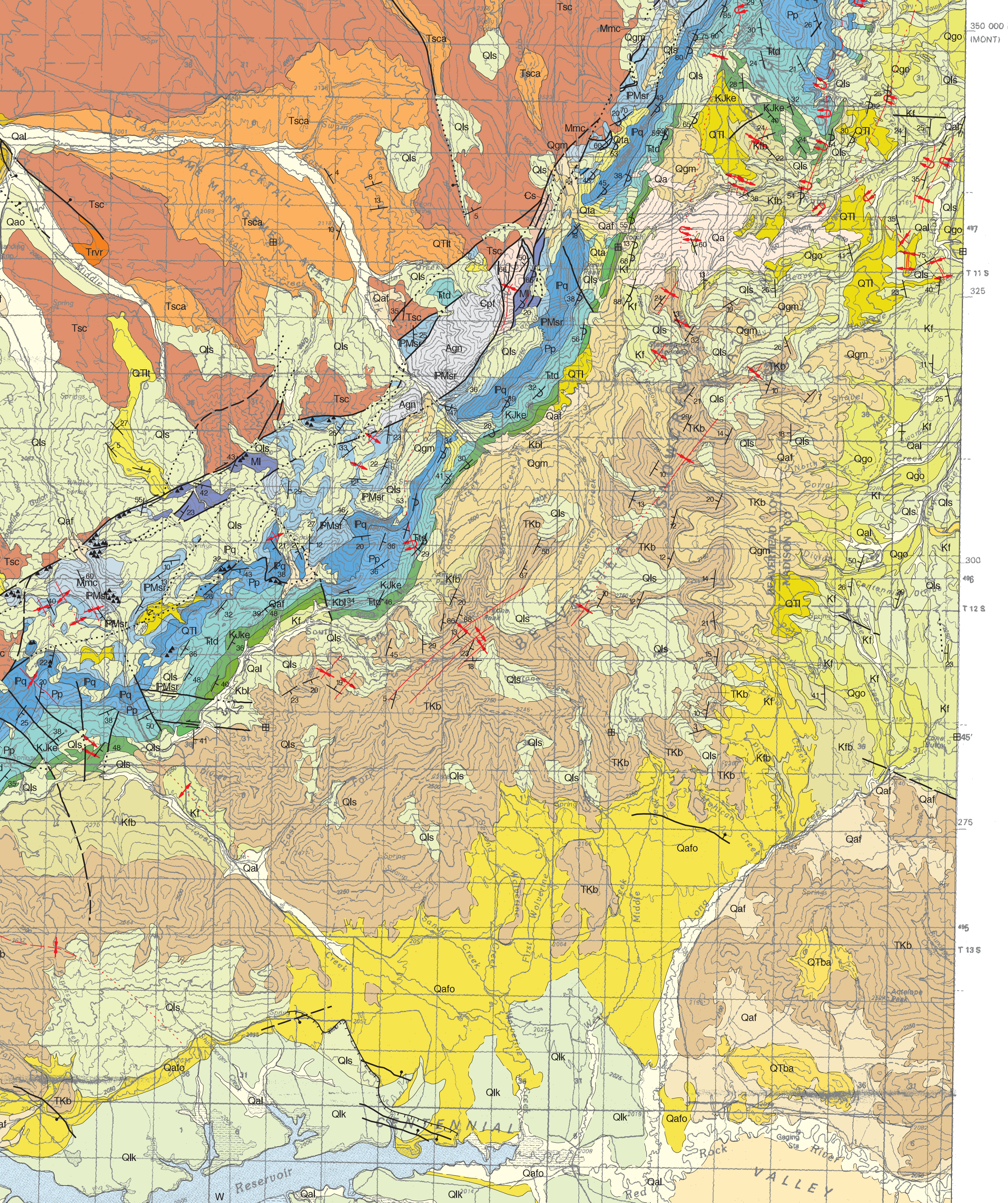


MAP UNITS

- Qal — Alluvium of modern channels and flood plains
- Qaf — Alluvial fan deposit
- Qlk — Lake deposit
- Qls — Landslide deposit
- Qc — Colluvium
- Trvh — Hall Spring Basalt of Dillon volcanics member, informal, Renova Formation
- TKgr — Gravel and conglomerate of uncertain affinities
- TKb — Beaverhead Group
- TKbr — Red Butte conglomerate, Beaverhead Group
- TKbl — Limestone conglomerate of the Beaverhead Group

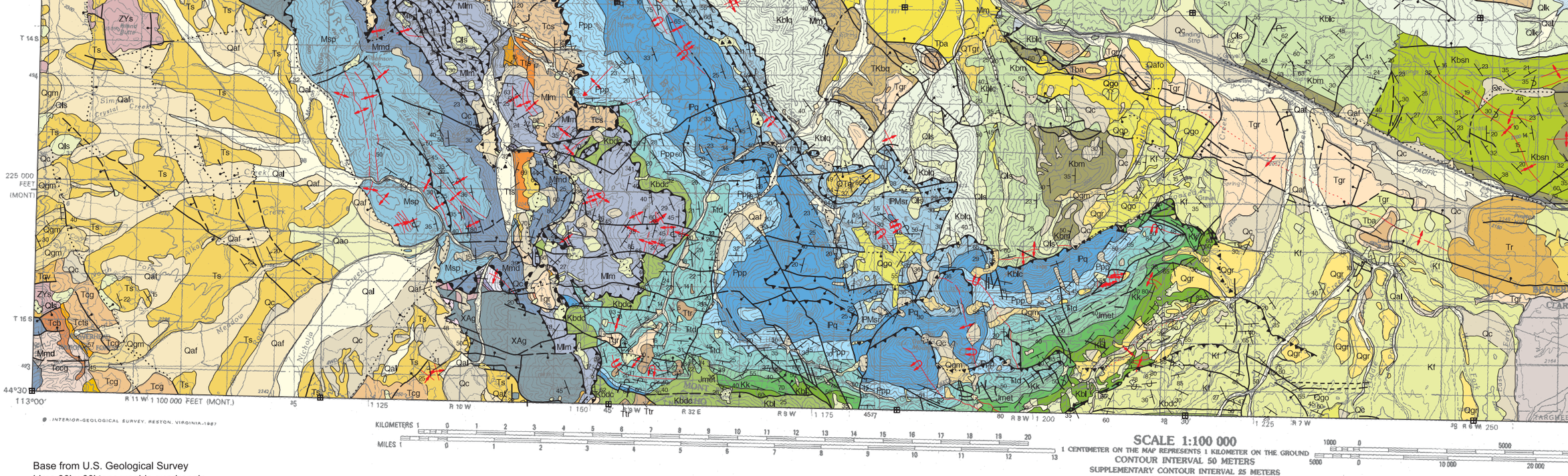


350
T 11 S
T 12 S
300
275
T 13 S
250



Symbol	Unit
Qc	Colluvium
Qgr	Gravel
Qta	Talus deposit
Qa	Avalanche deposit
Qle	Lake deposit and overlying eolian deposit
Qao	Alluvium, older, undivided
Qafo	Alluvial fan deposit, older
Qgl	Glacial lake deposit
Qgm	Glacial moraine deposit
Qgo	Glacial outwash deposit
QTs	Sediment, undivided
QTgr	Gravel
QTl	Ledford Pass Soil
QTba	Basaltic rocks, undivided
QTlt	Limestone and calcareous tufa
Tj	Jasperoid
Ti	Intrusive rocks, undivided
Tr	Rhyolite or rhyolitic sediment
Ta	Andesite
Tba	Basalt
Ttr	Travertine; lake or hot-spring deposits
Tgr	Gravel
Tsc	Sixmile Creek Formation
Tsca	Anderson Ranch member, informal, Sixmile Creek Formation
Tsct	Timber Hill Basalt member, informal, Sixmile Creek Formation
Tsm	Sedimentary rocks of Medicine Lodge beds, undivided
Ts	Sediment or sedimentary rocks, undivided
Tcg	Conglomerate
Tcs	Conglomerate and sandstone
Tos	Organic-rich shale
Tts	Tuffaceous shale
Tcv	Challis Volcanics Group
Tcts	Tuffs and sandstone of Challis Volcanics Group
Tccs	Conglomerate and sandstone of Challis Volcanics Groups
Tccg	Conglomerate and sandstone of the Challis volcanic group
Tct	Tuffs
Tcbs	Biotite-bearing sandstone of Challis Volcanics Group
Tcbt	Biotite-bearing tuff of Challis Volcanics Group
Tcr	Rhyolite of Challis Volcanics Group
Tcan	Andesite of Challis Volcanics Group
Tcb	Basalt of Challis Volcanics Group
Tcab	Breccia (Landslide deposit)
Tcqt	Quartzite-bearing tuff of Challis Volcanics Group

Symbol	Unit
TKbl	Limestone conglomerate of the Beaverhead Group
TKbq	Quartzite conglomerate, Beaverhead Group
Kblq	Little Sheep Quartzite of Beaverhead Group
Kblu	Upper limestone conglomerate of Beaverhead Group
Kblo	Oncoid limestone of Beaverhead Group
Kblc	Lima Conglomerate of the Beaverhead Group
Kbsn	Snowline Sandstone of Beaverhead Group
Kbll	Lower limestone conglomerate of Beaverhead Group
Kbm	Monida Sandstone of Beaverhead Group
Kbdc	Divide Creek Conglomerate of Beaverhead Group
Kf	Frontier Formation
Kfb	Frontier and Blackleaf Formations, undivided
Kbl	Blackleaf Formation
Kk	Kootenai Formation
KJke	Kootenai Formation and Ellis Group, undivided
Jmet	Morrison Formation, Ellis Group, and Twin Creek Formation, undivided
Js	Sedimentary rocks, undivided
Ћtd	Thaynes, Woodside, and Dinwoody Formations, undivided
Pp	Phosphoria Formation
Ppp	Phosphoria and Park City Formations, undivided
IPq	Quadrant Formation
IPMsr	Snowcrest Range Group or Formation
Ms	Sedimentary rocks, undivided
Msm	Scott Peak through McGowan Creek Formations, undivided
Mlm	Lombard Formation, Kibbey Formation, and Madison Group
Msp	Scott Peak Formation
Mtd	Tendoy Group
Mm	Madison Group, undivided
Mmd	Middle Canyon Formation
Mmc	Mission Canyon Limestone
Mmg	McGowen Creek Formation
Ml	Lodgepole Limestone
MDmt	McGowan Creek and Three Forks Formations, undivided
MDtj	Three Forks and Jefferson Formations, undivided
Dtm	Three Forks, Jefferson, Maywood? Formations, undivided
DOs	Sedimentary rocks, undivided
Oks	Kinnikinic and Summerhouse Formations, undivided
Ob	Bighorn Dolomite
O€s	Sedimentary rocks, undivided
€s	Sedimentary rocks, undivided
€sr	Snowy Range Formation
€ppm	Pilgrim, Park, and Meagher Formations, undivided
€pf	Park through Flathead Formations, undivided



Base from U.S. Geological Survey
Lima 30' x 60' topographic quadrangle
Map date: 1987
Projection: UTM zone 12; 1927 NAD

Montana Bureau of Mines and Geology
Open File 408, Plate 1

Geologic Map of the Lima 30' x 60' Quadrangle Southwest Montana

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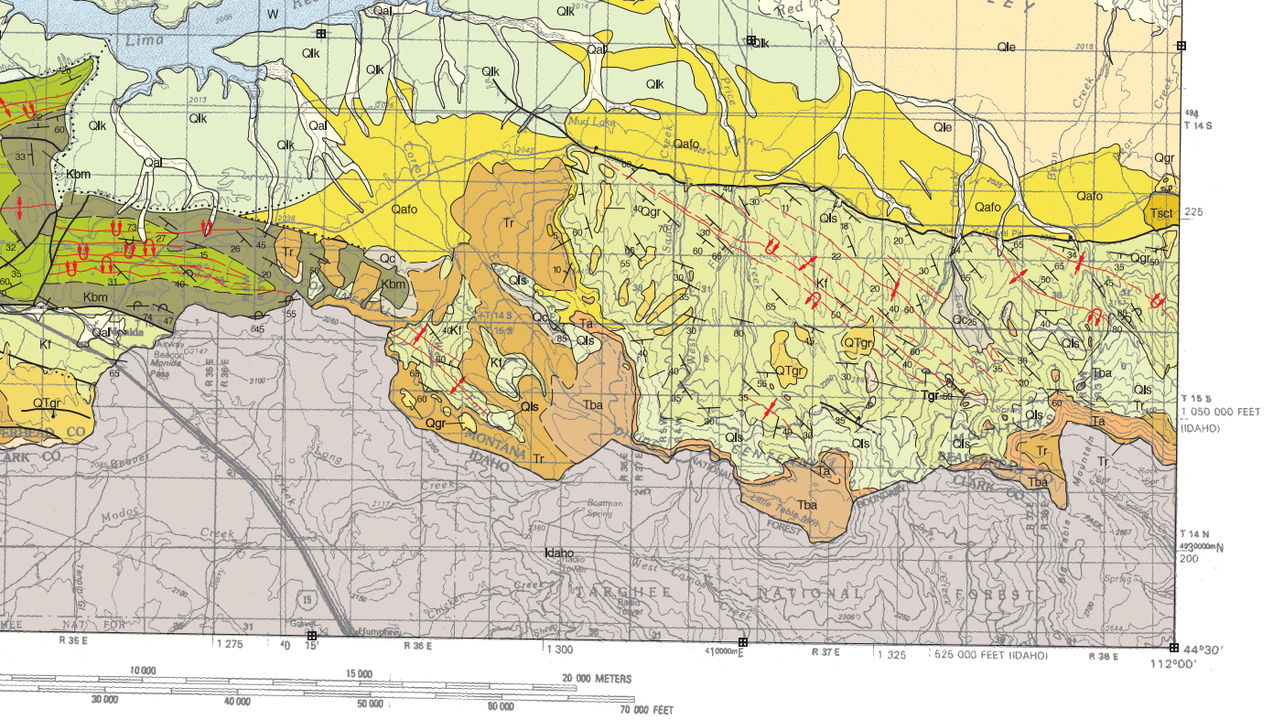
2000

Revised	Date
Map and text, added Plate 2	2/06

Partial support has been provided by the STATEMAP co
Mapping Program of the U.S.Geological Survey under

GIS production: Ken Sandau and Paul Thale, MBMG.



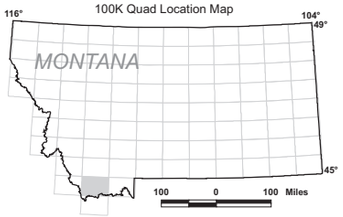
Tcqt	Quartzite-bearing tuff of Challis Volcanics Group	Cpf	Park through Flathead Formations, undivided
Tre	Renova Formation	Cwf	Wolsey and Flathead Formations, undivided
Trbt	Blacktail member, informal, Renova Formation	ZYs	Sedimentary rocks, undivided
Trw	White Hills member, informal, Renova Formation	XAg	Granite gneiss
Trc	Cook Ranch member, informal, Renova Formation	Agn	Gneissic rocks
Trvb	Basalt cap of Dillon volcanics member, informal, Renova Formation	Aqm	Quartzite and marble
Tqtz	Quartz	Aum	Ultramafic rock
Trvp	Rhyolitic pyroclastic rocks of Dillon volcanics member, informal, Renova Formati	W	Water
Trvr	Rhyolitic lava flows of Dillon volcanics Member, informal, Renova Formation	ID	
Trsd	Sage Creek and Dell members, informal, Renova Formation		

For a more detailed description of the map units and symbols, please refer to the text accompanying this map.

N

P component of the National Cooperative Geologic
nder Contract Number 99-HQ-AG-0130.
MG.

100K Quad Location Map



Quad index

SALMON	*DILLON*	*ENNIS*
LEADORE	LIMA	HEBGEN LAKE
BORAH PEAK	DUBOIS	*ASHTON*

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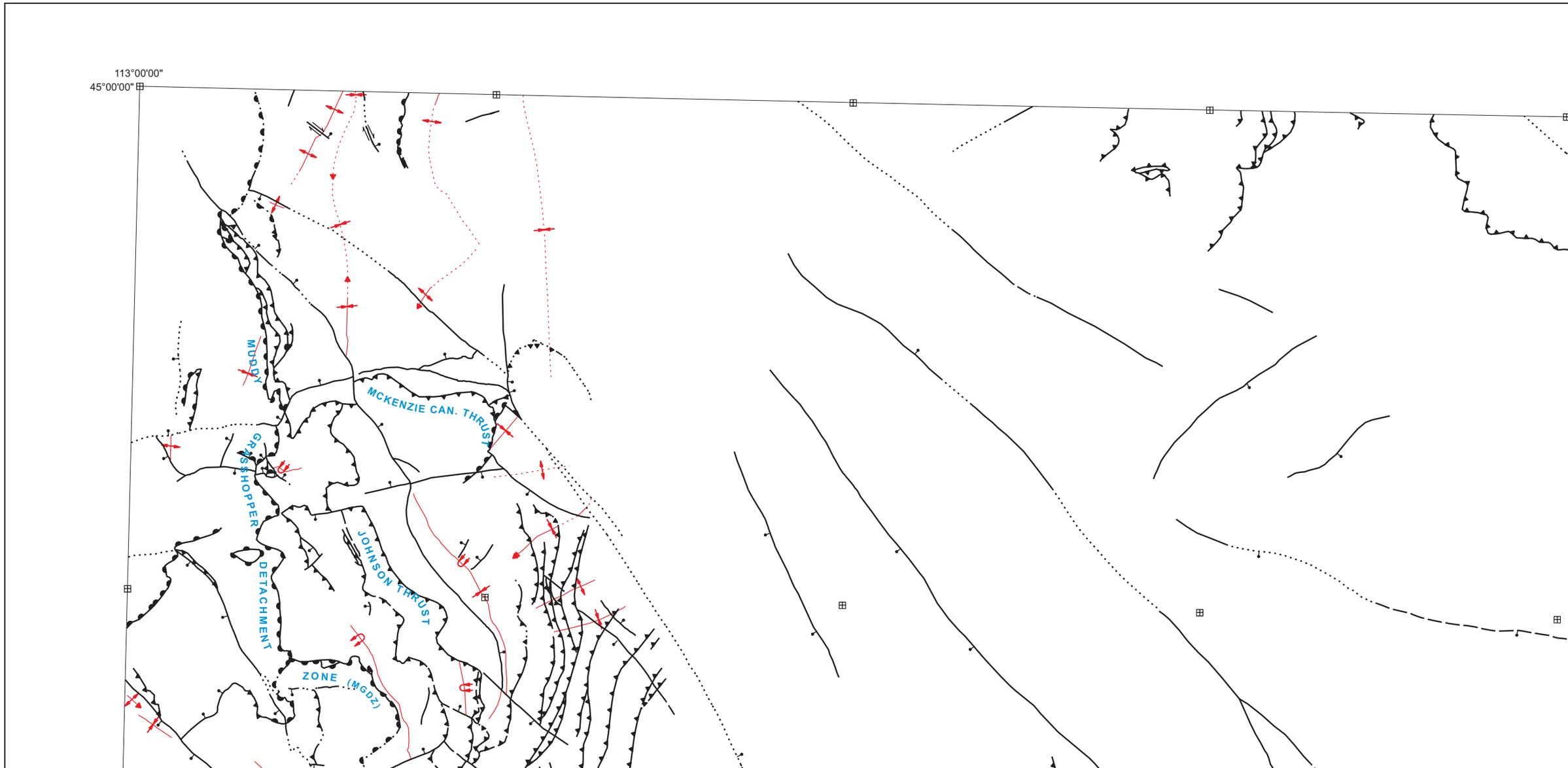
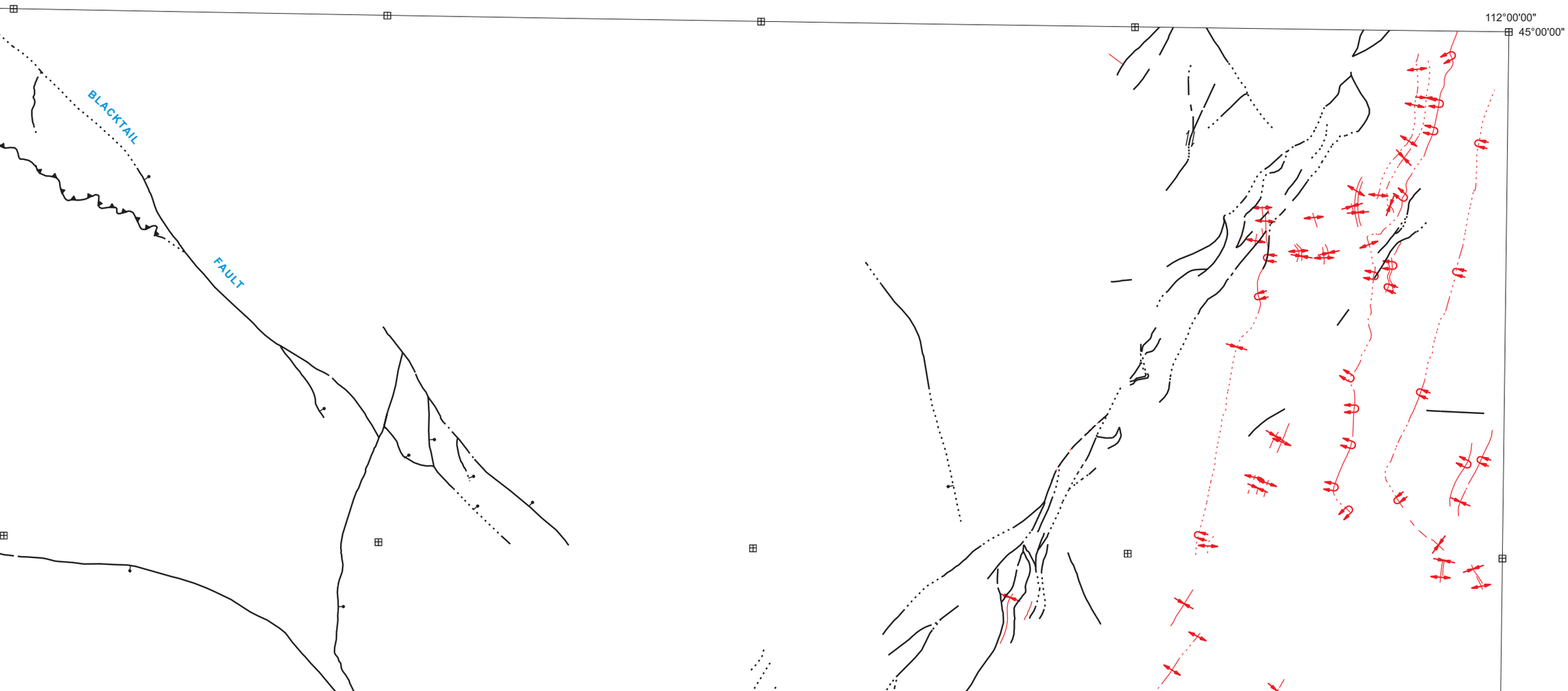
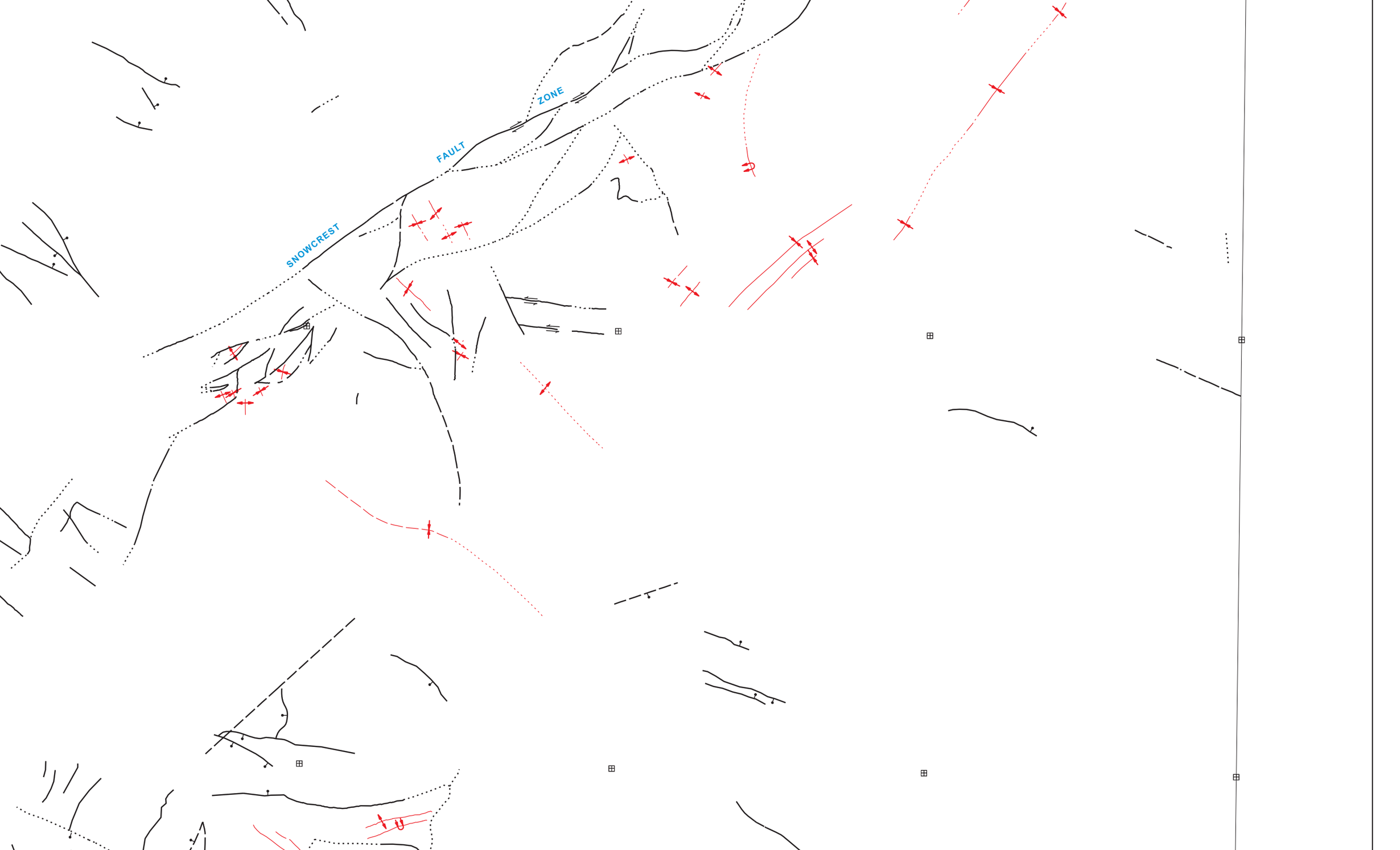
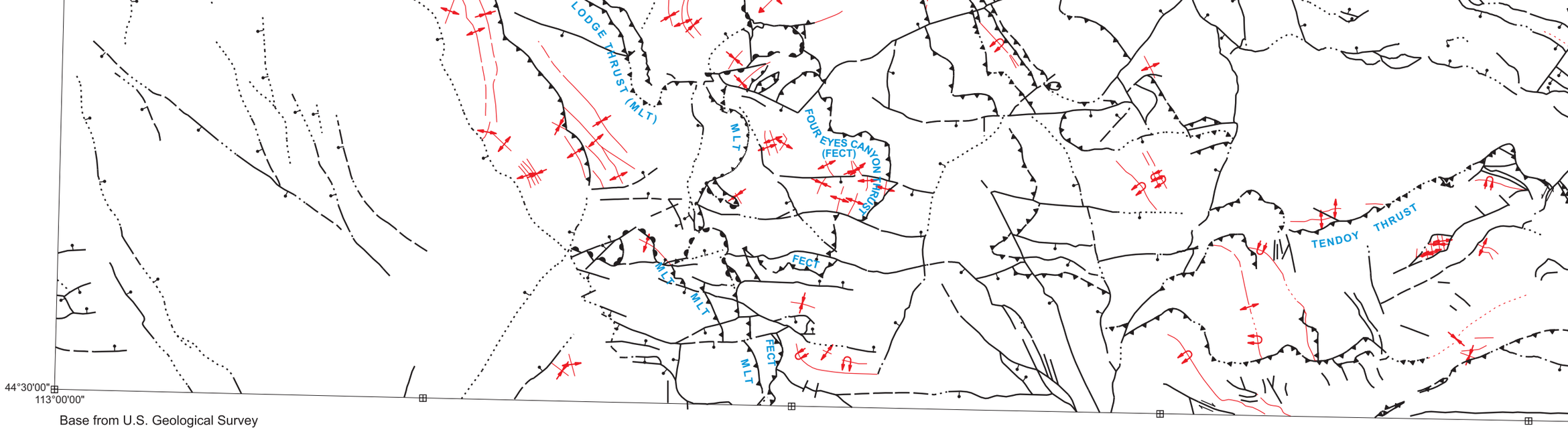
Open File MBMG 408, Plate 2 of 2
Faults and Folds, Lima 30'x60' Quadrangle




112°00'00"
45°00'00"
BLACKTAIL
FAULT

THRUST "A"
JOHNSON
THRUST
MUDDY
GRASSHOPPER DETACH. ZONE
MCKENZIE CAN
THRUST
TENDOY THRUST
RED ROCK FAULT
MLT
MLT
MLT
CABIN THRUST
MEDICINE LODGE THRUST (MLT)
CABIN
THRUST
MLT
MLT
MLT
MEDICINE LO
MGDZ
RED ROCK
FAULT
TENDOY THRUST


SNOWCREST
FAULT
ZONE



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Lima 30' x 60' topographic quadrangle
Map date: 1987
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KILOMETERS 1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

MILES 1 0 1 2 3 4 5 6 7 8 9 10 11 12 13

SCALE 1:1
1 CENTIMETER ON THE MAP REPRESENTS
CONTOUR INTERVA

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Open File 408

Plate 2: Faults and Folds of the Lima 30' x 60' Quadrangle Southwest Montana

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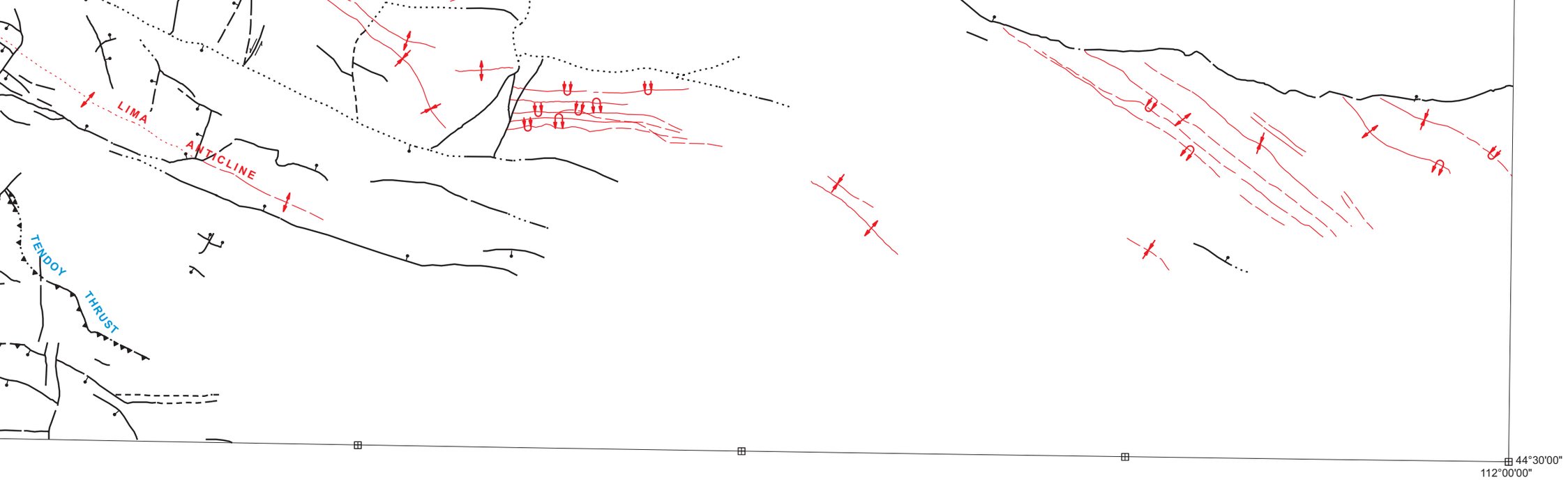

:100 000
NTS 1 KILOMETER ON THE GROUND
VAL 20 METERS

1000 0 5000 10 000 15 000 20 000 METERS
5000 0 10 000 20 000 30 000 40 000 50 000 60 000 70 000 FEET

N

Quad index

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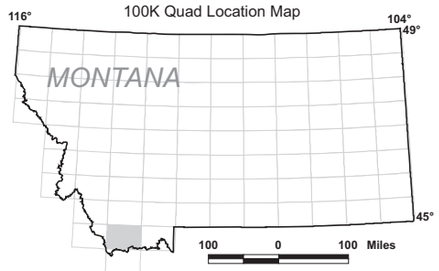
100K Quad Location Map



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