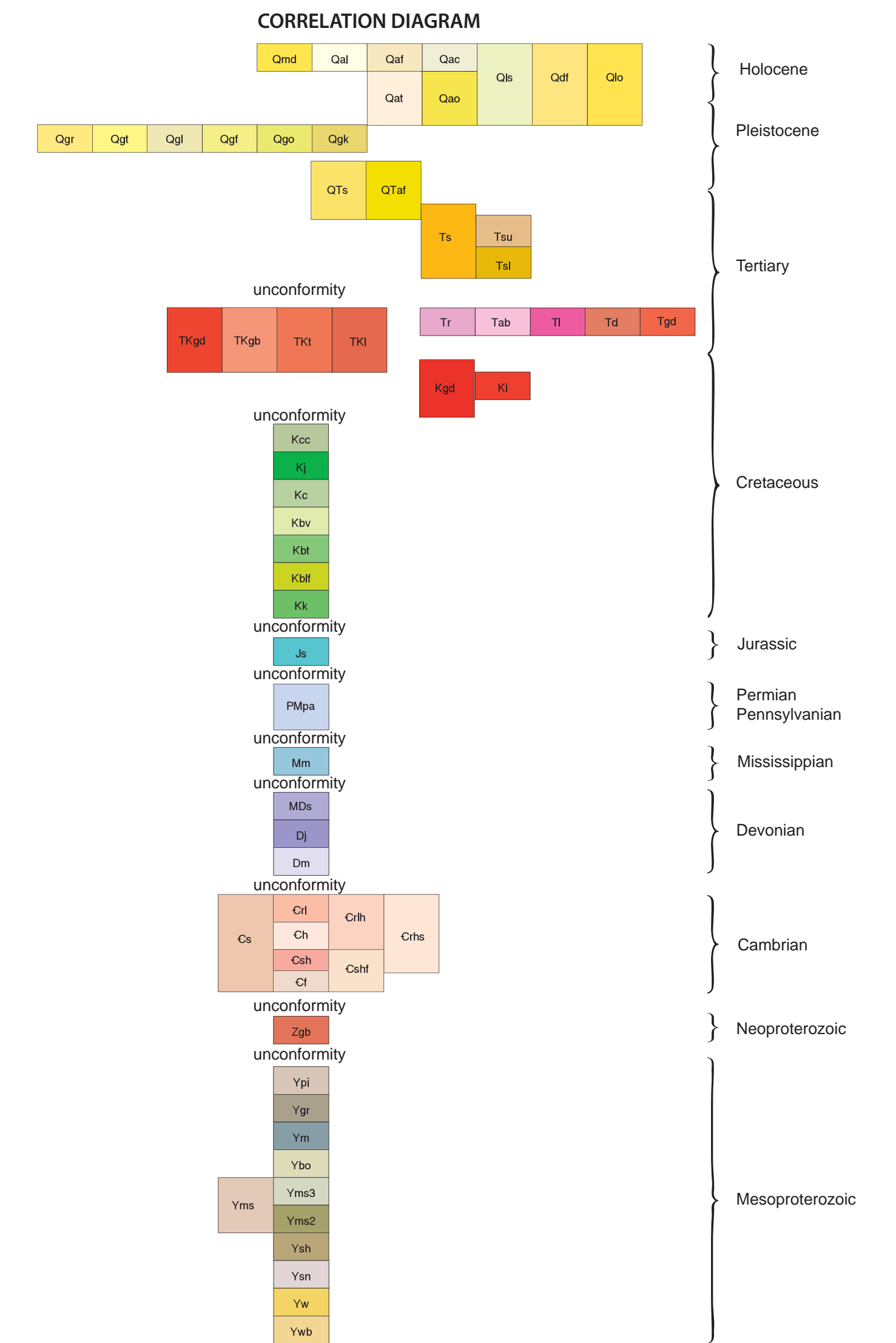
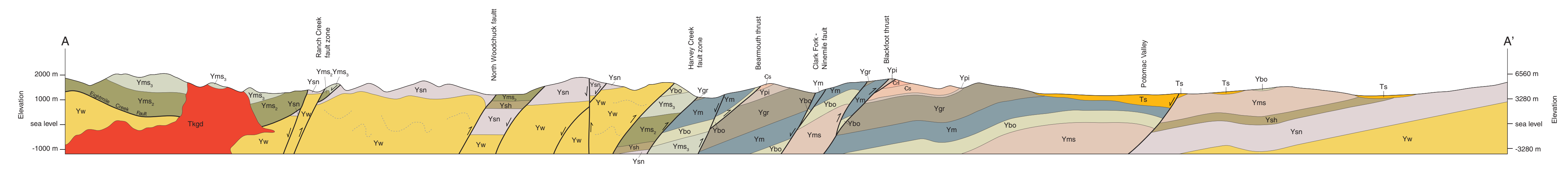
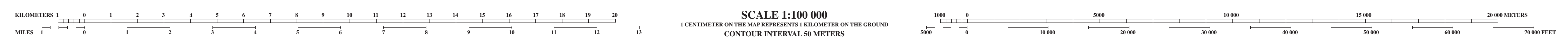


- MAP UNITS**
- Qnd Alluvium of modern channels and flood plains
  - Qal Alluvium of modern channels and flood plains
  - Qaf Alluvial fan deposit
  - Qat Alluvium and colluvium, undivided
  - Qm Alluvium of alluvial terrace
  - Qol Alluvium, older, undivided
  - Qs Landslide deposit
  - Qdf Debris flow deposit
  - Qcl Loss deposit
  - Qy Gravel
  - Qg Glacial till
  - Ql Glacial lake deposit
  - Qf Glacial flood gravels
  - Qp Glacial outwash deposit
  - Qk Glacial kame deposit
  - Qts Sediment, undivided
  - Qta Alluvial fan deposit
  - Ts Sediment or sedimentary rocks, undivided
  - Tm Sediment or sedimentary rocks, upper member
  - Tl Sediment or sedimentary rock, lower member
  - Tp Rhyolite and rhyolitic sediment
  - Ta Andesite and Basalt
  - Ti Latic and porphyritic latite
  - Td Dacite, intrusive and extrusive
  - Tg Granodiorite
  - Tgr Granodiorite
  - Tgs Gabbroic and dioritic dikes and sills
  - Ttr Trachyte
  - Tlp Lamprophyre
  - Tcr Granodiorite
  - Tir Intrusive rocks, undivided
  - Kv Carter Creek Formation
  - Jf Jens Formation
  - Kc Coburn Formation
  - Kv Vaughn Member of Blackleaf Formation
  - Kd Talt Hill Member of Blackleaf Formation
  - Kf Flood Member of Blackleaf Formation
  - Ks Koonson Formation
  - J Sedimentary rocks, undivided
  - Pm Phosphoria, Quadrant, and Anisot Formations, undivided
  - M Madison Group, undivided
  - Md Sedimentary rocks, undivided
  - J Jefferson Formation
  - D Maywood Formation
  - C Sedimentary rocks, undivided
  - R Red Lion Formation
  - Ch Red Lion and Hasmark Formations, undivided
  - Cha Red Lion, Hasmark, and Silver Hill Formations, undivided
  - Chs Hasmark Formation
  - Chf Silver Hill Formation
  - Chm Silver Hill and Flathead Formations, undivided
  - Cf Flathead Formation
  - Zp Gabbro and diorite, sills
  - Yp Fiske Formation
  - Zp General Range Formation
  - Mc McNamee Formation
  - Yb Bonner Formation
  - Ym Mount Shields Formation
  - Ym3 Mount Shields Formation, third member
  - Ym2 Mount Shields Formation, second member
  - Ys Shepard Formation
  - Yw Snowlip Formation
  - Yw Wallace Formation
  - Yab Wallace Formation, Brecca member
  - W Water

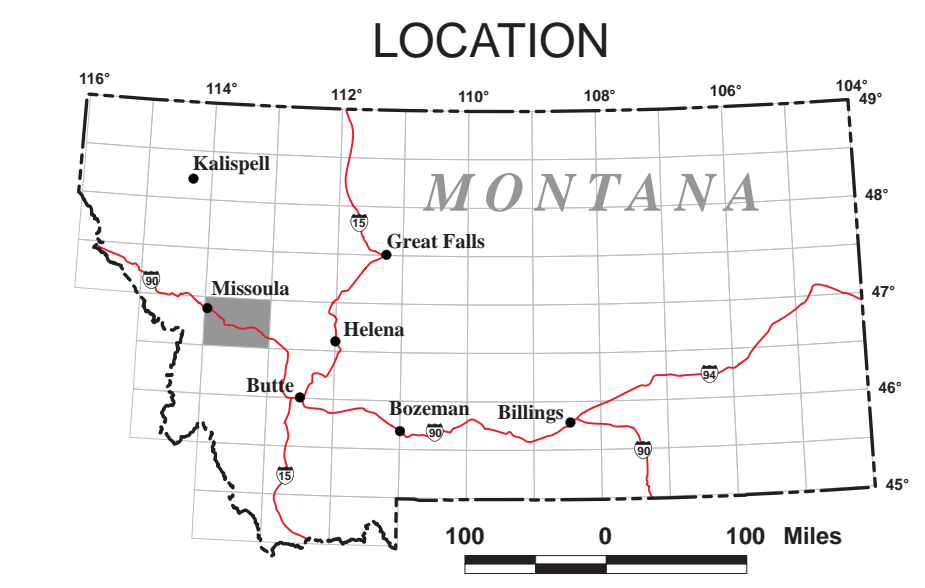


- Map Symbols**
- Contact dashed where approximately located; dotted where concealed
  - Normal fault: dashed where approximately located; dotted where concealed; bar and ball on downthrown side
  - Thrust fault: teeth on upthrown block; dashed where approximately located; dotted where concealed
  - Low-angle normal fault: symbols on hanging wall
  - Anticline: showing trace of axial plane and plunge direction where known; dotted where concealed
  - Overturned anticline: showing trace of axial plane and direction of dip of bedding; dashed where approximately located; dotted where concealed
  - Syncline: showing trace of axial plane and plunge direction where known; dotted where concealed
  - Overturned syncline: Showing trace of axial plane and direction of dip of bedding; dashed where approximately located; dotted where concealed
  - Tertiary andesite dikes
  - Tertiary through Cretaceous gabbro and granodiorite dikes
  - Strike and dip of inclined beds
  - Vertical bedding
  - Foliation
  - Vertical foliation
  - Strike and dip of overturned bedding
  - Strike and dip of bedding where stratigraphic tops were confirmed using primary sedimentary structures
  - Strike and dip of overturned bedding where stratigraphic tops were confirmed using primary sedimentary structures
  - Cleavage
  - Horizontal bedding

Base from U.S. Geological Survey  
Missoula 30' x 60' topographic quadrangle  
Base Map date: 1984  
Projection: UTM zone 12; 1927 NAD  
UTM grid declination 1°49' West  
1984 Magnetic North declination 17.5° East



Horizontal scale same as map  
No vertical exaggeration  
Surficial units not shown  
Datum is mean sea level



30' x 60' quadrangle index

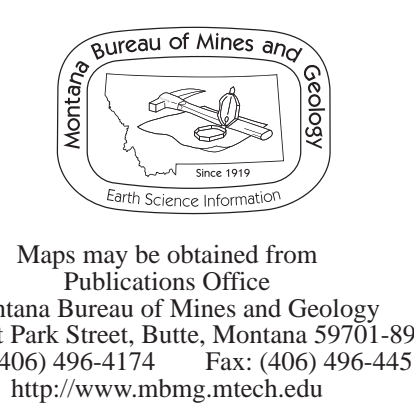
PLAINS	SEELYE LAKE	DEARBORN RIVER
MISSOULA WEST	MISSOULA EAST	ELLISTON
HAMILTON	PHILIPSBURG	SUITE NORTH

Montana Bureau of Mines and Geology  
Open File MBMG 593, Plate 1

## Geologic Map of the Missoula East 30' x 60' Quadrangle, Western Montana

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James W. Sears<sup>2</sup>, and Larry N. Smith<sup>3</sup>

2010



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GIS production: Ken Sandau and Paul Thale, MBMG. Map layout: Susan Smith, MBMG.