

IDEALIZED STRATIGRAPHIC COLUMN

Northern Gallatin and Madison Ranges

Montana

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After: Hall, 1961; McMannis and Chadwick, 1964; Witkind, 1969;
 Kehew, 1971; Montagne, C., 1972; Montagne, J., 1975

TIME UNITS			THICK. (AVG.)	FORMATION	LITHOGRAPHIC COLUMN	ABBREVIATED LITHOLOGY	
ERA	PER.	EPOCH					
CENOZOIC	QUATERNARY	HOLOCENE (RECENT)	0-100'	ALLUVIUM COLLUVIUM MASSWASTING AEOLIAN DEP. NEOGLACIATION		Chaotic debris Loess and sand Till restricted to cirques Lacustrine silts from ice dammed lakes Fresh till	
		PLEISTOCENE	0-200'	PINEDALE GLACIATION		Partly weathered till	
				BULL LAKE GLACIATION		Deeply weathered till	
				PRE BULL LAKE GLACIATION		Welded rhyolite tuff	
		2 M.Y.B.P. (Million Years Before Present)				HUCKLEBERRY RIDGE TUFF	Stream gravel, unconsolidated
		TERTIARY	PLIOCENE	0-100'		GRAVEL	Assorted conglomerate sandstone, siltstone and shale, mostly light colored, calcareous and tuffaceous
	MIOCENE		0-?	BOZEMAN GROUP			
	OLIGOCENE						
	EOCENE (MIDDLE)		3000' 6000'	GALLATIN - ABSAROKA VOLCANICS		Andesite lava flows, flow breccias and stratified volcanic breccia	
	(EARLY)		0-50'	CONGLOMERATE and SILTSTONE		Conglomerate consisting of Precambrian and later boulders and cobbles	
	PALEOCENE		70 M.Y.B.P.	LIVINGSTON GROUP ?		Siltstone, shale, some andesitic sandstone	
	MESOZOIC	CRETACEOUS	UPPER	1000'+			Sandstone and chert pebble conglomerate Lafite or monzonite porphyry sill Gray siliceous shale with interbedded hard, white tuff Well cemented salt and pepper sandstone
LOWER				440'	ALBINO FORMATION	Black shale with interbedded bentonite seams Pastel colored claystone, mudstone, and shale with interbedded sandstone ? Andesite porphyry sill (local only)	
				70'	MUDDY SS	Grayish-green to buff cross-bedded salt and pepper sandstone	
				150'	THERMOPOLIS SHALE	Medium to dark gray, fissile carbonaceous shale	
				400'	KOOTENAI FORMATION	Well sorted white to hematite stained quartz sandstone Fresh water limestone with overlying variegated red, yellow-brown, and gray mudstone	
135 M.Y.B.P.					Yellow-brown to maroon mudstone and shale, limy siltstone, and fresh water limestone Gray, thick bedded, cross-bedded coarse grained sandstone. Conglomeratic at base (chert pebble cgl)		

*see next page for Jurassic & older rocks

*see previous page for Cretaceous & younger rocks

