DRAFT 2

Summary Table: Characteristics of the Ecoregions of Montana
Second Edition

15. NORTHERN ROCKIES

Level IV Ecoregion		Physiography		Geology	Soil			Climate			Potential Natural Vegetation*	Land Cover and Land Use
	Area (square miles)		Elevation/ Local Relief (feet)	Surficial and Bedrock	Order (Great Group)	Common Soil Series	Temperature/ Moisture Regimes	Precipitation Mean annual (inches)	Frost Free Mean annual (days)	Mean Temperature January min/max; July min/max (°F) or Seasonality	*Source: Ross, R.L., and Hunter, H.E., 1976	
15a. Grave Creek Range–Nine Mile Divide	1848	Partially glaciated. Northwest-southeast trending, forested mountains are mostly covered by deposits of volcanic ash and underlain by Precambrian Belt formations.	3200-8000/ 800-4000	Quaternary colluvial, ash, alluvial, glacial drift, and glacial lake deposits. Precambrian argillite, argillaceous rocks, and quartzite of the Missoula Group, Ravalli Group, and Prichard Formation; also some Precambrian Wallace Formation. Rock outcrops.	Inceptisols (Cryochrepts, Eutrochrepts, Ustochrepts), Alfisols (Haplustalfs), Entisols (Cryorthents). Often andic.	Holloway, Evaro, Winkler, Mitten, Beeskove, Repp, Tevis, Wildgen, Winfall, Courville, Craddock, Half Moon, Petty, Glaciercreek	Cryic, Frigid/ Udic, Ustic	25-66	50-100	Long cold winters, moist springs	Subalpine fir, Douglas-fir, grand fir, and ponderosa pine forests.	Logging, mining, wildlife habitat, and recreation. In the Clark Fork Valley: residential activity.
15b. Camas Valley	190	Treeless valley, almost level in places and containing sodic soils, in the rainshadow of the Salish Mountains. Flowing springs, hot springs, and wetlands occur locally. Huge, excessively-drained ripple marks occur in the dry Camas Prairie Basin.	2800-3400/ 25-600	Quaternary lake sediments are common; also glacial, fluvioglacial, and flood deposits occur.	Inceptisols (Xerochrepts), Alfisols (Natrixeralfs), Mollisols (Haploxerolls, Natrixerolls, Argixerolls), Entisols (Xerorthents)	Dryfork, Round Butte, Jocko, Belton, Selow, Vincom, Remount, Bowlake, Bigarm, Irvine. Often illitic; sometimes sodic.	Frigid/ Ustic, Xeric, Aridic	12-16	90-110	16/32; 50/88	Foothills prairie; sagebrush is now common and has largely replaced bunchgrass.	Grazing and cropland.
15c. Flathead Valley	1009	Treeless, intermontane valley with areas of lake-moderated climate. Generally sheltered but sporadic, cold, north-northeast winds affect the Upper Flathead Valley. Oxbow lakes (sloughs) and wetlands occur in the Upper Flathead Valley.	2900-4000/ 25-800	Quaternary glacial drift, lacustrine, and alluvial deposits.	Mollisols (Haploborolls, Natriborolls), Inceptisols (Ustochrepts), Alfisols (Natrixeralfs, Haploxeralfs)	Flathead, Truscreek, Kalispell, Polson, Sacheen, Belton, Post, McCollum, Kingspoint, Round Butte, Ronan, Connah, Jocko	Frigid/ Udic, Ustic, Xeric	14-25; most rainfall in east and north	85-150; low spots in east have short growing season	16/32; 50/86	Foothills prairie.	Unirrigated and irrigated cropland, pastureland, rural residential, suburban, and commercial activity. Alkali accumulation has occurred as a result of irrigation.
15d. Tobacco Plains	47	Treeless, well-drained, low relief plains and hills with lakes, xeric soils, and drumlin fields in the Rocky Mountain trench.	2600-4000/ 50-1000	Quaternary glacial drift, alluvial, glaciofluvial, and lacustrine deposits.	Mollisols (Haploxerolls, Haploborolls), Entisols (Xeropsamments), Inceptisols (Xerochrepts)	McCollum, Sacheen, Gird, Biglake, Kerrdam, Niarada, Flott	Frigid/ Xeric	20	70-91	12/30; 46/86	Western ponderosa pine forests.	Mill and sand - gravel operations, grazing, residential and commercial activity.
15e. Flathead Hills and Mountains	637	Partially glaciated. Forested, sparsely wooded or treeless hills and low mountains that are in the rainshadow of the Salish Mountains and typically rather dry.	3000-7200/ 600-3500	Quaternary colluvium, ash, and some glacial drift. Argillite, argillaceous rocks, and quartzites of the Precambrian Ravalli Group and Prichard Formation. Rock outcrops.	Inceptisols (Eutrochrepts, Ustochrepts, Cryochrepts), Alfisols (Eutroboralfs), Mollisols (Haploxerolls, Argixerolls)	Wildgen, Winkler, Courville, Mitten, Winfall, Rumblecreek, Bigarm, Minesinger, Craddock, Holloway, Bowlake, Bigdraw	Frigid/ Udic, Ustic, Xeric	16-26	50-70	Long cold winters, moist springs	Subalpine fir, Douglas-fir, grand fir, and ponderosa pine forests.	Logging, grazing, and wildlife habitat.
15h. High Northern Rockies	462	High, wet, glaciated mountains and crests in the Northern Rockies (15) that are characterized by rockland, talus, and/or a mixed high elevation climax vegetation.	6000-10700/ 500-2600	Quaternary glacial till, colluvium, and ash. Argillite, quartzite, granite, gneiss, limestone, and sandstone of various ages. Rock outcrops.	Inceptisols (Cryochrepts, Cryumbrepts, Cryandepts), Entisols (Cryorthents). Often andic especially in the northwest.	Garlet, Lolopeak, Holloway, Phillcher, Coerock, Whitore. Very gravelly to stony soils.	Cryic/ Udic	60-100; high mountains trap Pacific moisture	less than 40	Long cold winters, moist springs, and cool, short summers	High elevation forests, alpine, and Krummholz. vegetation. In cirques: mixed subalpine fir, whitebark pine, mountain hemlock, and alpine larch forests. Above timberline: alpine vegetation. In windswept areas between forest and alpine zones: Krummholz vegetation.	Wildlife habitat, native pastureland, and recreation.
15k. Clark Fork Valley and Mountains		NOT FINISHED										
15l. Salish Mountains	3904	Partially glaciated by the Cordilleran Ice Sheet. Rather low forested mountains are underlain by Precambrian Belt formations; no alpine areas occur. Volcanic ash is found on peaks and ridges and glacial till occurs in the north where it influences slope hydrology; perennial steams are more numerous on till than elsewhere.	2500-7500 (elevations over 7000 are rare)/ 400-3700	Quaternary outwash deposits, colluvium, volcanic ash, and, in the north, glacial till. Precambrian argillite, argillaceous rock, quartzite, siltite, and dolomite of the Ravalli Group, Piegan Group, and Wallace Formation. Rock outcrops.	Alfisols (Cryoboralfs, Eutroboralfs, Haplustalfs), Inceptisols (Eutrochrepts, Cryochrepts), Entisols (Cryorthents). Sometimes andic, especially at higher elevations.	Bata, Courville, Jimlake, Tevis, Waldbillig, Mollman, Yourame, Rumblecreek. In north: often derived from till. In south: derived from residuum.	Cryic, Frigid/ Udic, Ustic	20-50; max. greater in glaciated northern portion	30-70	Long cold winters, moist springs	Subalpine fir, Douglas-fir, and grand fir forests, also Engelmann spruce. With loss of the climax forest overstory, ponderosa pine, western larch, and, sometimes, lodgepole pine can replace Douglas-fir or grand fir.	Extensive logging, wildlife habitat, and recreation.
15o. Coeur d'Alene Metasedimentary Zone		NOT FINISHED										
15p. St. Joe Schist–Gneiss Zone		NOT FINISHED										
15q. Purcell–Cabinet–North Bitterroot Mountains		NOT FINISHED										
15t. Stillwater-Swan Wooded Valley	780	A long, forested, glaciated valley with many wetlands and ponds; drainage can be nonintegrated and hummocky areas occur.	2400-5000/ 75-1000	Thick Quaternary alluvial, colluvial, and glacial drift deposits are characteristic. Volcanic ash deposits occur. Locally, rock outcrops of the Precambrian Ravalli and Piegan groups occur.	Inceptisols (Cryochrepts, Eutrochrepts), Alfisols (Cryoboralfs, Eutroboralfs, Haplustalfs), Entisols (Cryorthents)	Waldbillig, Holloway, Bata, Rumblecreek, Winfall, Jimlake, Yourame, Mollman, Felan	Cryic, Frigid/ Udic, Ustic	16-30	55-90	8/30; 44/82	Douglas-fir and grand fir forests. In the Swan River Valley: Engelmann spruce–subalpine fir on moister sites and Douglas-fir–Engelmann spruce on gravelly, droughty soils.	Logging, wildlife habitat, and rural residential development.

16. IDAHO BATHOLITH

Level IV Ecoregion		Physiography		Geology	Soil			Climate			Potential Natural Vegetation*	Land Cover and Land Use
	Area (square miles)		Elevation/ Local Relief (feet)	Surficial and Bedrock	Order (Great Group)	Common Soil Series	Temperature/ Moisture Regimes	Precipitation Mean annual (inches)	Frost Free Mean annual (days)	Mean Temperature January min/max; July min/max (°F) or Seasonality	*Source: Ross, R.L., and Hunter, H.E., 1976	
16a. Eastern Batholith	1056	Partially glaciated. These forested mountains are underlain mostly by igneous rocks and lie north and west of the Continental Divide. High elevation lakes occur.	4000-9000/ 600-3500	Quaternary drift, colluvium, alluvium, and volcanic ash. Cretaceous granites of the Idaho Batholith; also some Precambrian Belt rocks and Tertiary volcanics. Rock outcrops.	Inceptisols (Cryochrepts, Ustochrepts, Cryumbrepts), Mollisols (Haploborolls), Entisols (Cryorthents)	Ovando, Lolopeak, Victor, Winkler, Petty, Elkner, Phillcher, Evaro	Cryic, Frigid/ Udic, Ustic	16-55	30-70	Long cold winters, moist springs	Subalpine fir, Douglas-fir, and ponderosa pine forests.	Logging, grazing, mining, wildlife habitat, and recreation.
16b. Lochsa Uplands		NOT FINISHED										
16e. Glaciated Bitterroot Mountains and Canyons	576	Glaciated, faulted, forested, north to south trending mountains underlain by the Cretaceous Idaho Batholith. Jagged peaks, lakes, and distinctive, nearly parallel ice-gouged valleys are common. Lakes and wetlands occur. Surface waters have very low alkalinity. Climate is moderated by Pacific air masses in winter.	4000-9500/ 800-4500	Extensive Quaternary glacial drift, volcanic ash, colluvium, and alluvium. Alpine glaciers reached the Bitterroot Valley south of Hamilton. Outwash deposits common in the lower sections of mountain valleys north of Hamilton. Cretaceous gneissic quartz monzonite and granodiorite, gneiss, and schist. Rock outcrops.	Inceptisols (Cryumbrepts, Cryochrepts, Ustochrepts), Entisols (Cryorthents). Mostly andic.	Mostly Lolopeak, Petty; also, Winkler, Woodside	Cryic, Frigid/ Udic, Ustic, Xeric	16-70	30-70	Long cold winters, moist springs	Subalpine fir, Douglas-fir, and ponderosa pine forests.	Mostly wilderness, and wildlife habitat. Some logging and grazing on the lower slope.
16h. High Idaho Batholith		NOT FINISHED										

17. MIDDLE ROCKIES

Level IV Ecoregion		Physiography		Geology	Soil			Climate			Potential Natural Vegetation*	Land Cover and Land Use
	Area (square miles)		Elevation/ Local Relief (feet)	Surficial and Bedrock	Order (Great Group)	Common Soil Series	Temperature/ Moisture Regimes	Precipitation Mean annual (inches)	Frost Free Mean annual (days)	Mean Temperature January min/max; July min/max (°F) or Seasonality	*Source: Ross, R.L., and Hunter, H.E., 1976	
17d. Eastern Gravelly Mountains	261	Glaciated. Mostly forested mountains with large areas of subdued, glaciated topography studded with potholes.	6000-9900/ 200-3200	Quaternary glacial drift, and colluvium. Folded and faulted mountains with a core of Mesozoic and Paleozoic sediments (including carbonates); lower slopes composed of Precambrian pre-Belt metamorphic rocks and Tertiary rhyolite. Pebbly conglomerate along the crest. Rock outcrops.	Mollisols (Cryoborolls), Alfisols (Cryoboralfs), Entisols (Cryorthents)	Woodhall, Blaine, Worock, Leavitt	Frigid, Cryic/ Udic, Ustic	20-31	50-75	Cold winters, moist springs	Subalpine fir and Douglas-fir forests; also barrens.	Grazing, logging, wildlife habitat, and recreation.
17e. Barren Mountains	854	Partially glaciated. Rather dry, partially forested, block faulted mountains with high basal elevations that are characteristically underlain by carbonate-rich sedimentary rocks.	5600-11100/ 1000-3200	Quaternary glacial drift, and colluvium. High, forested peaks usually composed of Mesozoic and Paleozoic sedimentary formations including the Madison Limestone, and Tertiary volcanics; low, open forested areas tend to be underlain by Precambrian rock. Rock outcrops.	Mollisols (Cryoborolls), Alfisols (Cryoboralfs), Entisols (Ustorthents, Cryorthents), Inceptisols (Cryochrepts, Ustochrepts)	Whitore, Hanson, Rochester, MacFarlane, Woodhall, Blaine, Worock, Leavitt, Garlet, Shadow, Whitecow, Raynesford, Maurice, Libeg, Tiban	Frigid, Cryic/ Udic, Ustic	14-31; lower altitudes are usually semiarid	27-70	Long cold winters, moist springs	Subalpine fir–Douglas-fir forests with a limited elevation extent; barren and sparsely vegetated areas are common. Pacific Coast forest elements are absent. Lower treeline lies between 5,600-7,000 feet. Forests have an understory of grass.	Grazing, logging, mining, and recreation.
17f. Crazy Mountains	320	Glaciated. Rugged, forested mountains with an intrusive igneous-core, dikes, swarms of sills and laccoliths. Lakes occur.	6000-9000/ 1000-3000	Quaternary drift and colluvium. The core of the Crazy Mountains is composed of Tertiary coarse-grained intrusives; dikes radiate from it. Elsewhere, late-Cretaceous water-laid volcanics of the Livingston Formation, sills, and laccoliths. Rock outcrops.	Inceptisols (Cryochrepts), Alfisols (Cryoboralfs, Paleboralfs), Entisols (Cryorthents)	Garlet, Cowood, Stemple, Tigeron, Worock. Often stony.	Cryic, Frigid/ Udic, Ustic	16-55	30-70	Long cold winters, moist springs, short summers	Subalpine fir and Douglas-fir forests.	Logging, recreation, and wildlife habitat.
17g. Mid-Elevation Sedimentary Mountains	1132	Partially glaciated. Carbonate-rich, mostly forested mountains and hills. Some lakes and springs occur.	4800-9900/ 400-3200	Quaternary drift and colluvium. Faulted-folded Mesozoic - Paleozoic sedimentary rocks including limestone are typical; igneous intrusions occur especially in the Madison Range. Rock outcrops.	Alfisols (Cryoboralfs), Mollisols (Cryoborolls), Inceptisols (Cryochrepts, Ustochrepts)	Helmville, Whitore, Firada, Whitefish, Leavitt, Hanson, Whitecow, Gallatin	Cryic, Frigid/ Udic, Ustic	20-41	30-70	Long cold winters, moist springs	Subalpine fir and Douglas-fir forests.	Logging, grazing, mining, recreation, and wildlife habitat.
17h. Alpine Zone	882	Glaciated. High, wet, often severely exposed mountains above timberline that were modified by alpine glaciation. Rockland, talus, plateaus, and lakes are found especially in the Absaroka Range and on the Beartooth Plateau. Permafrost occurs and solifluction has created patterned ground in the alpine areas of the Beartooth Plateau. Deep winter snowpack; meltwater significantly influences summer stream flow at lower elevations.	8500-12800/ 300-4000	Quaternary drift and colluvium. Precambrian, pre-Belt rock and Tertiary volcanics - intrusives common; also Mesozoic and Paleozoic sedimentary rock occur. Rock outcrops are common.	Inceptisols (Cryochrepts, Cryumbrepts, Cryaquepts), Entisols (Cryorthents)	Cowood, Mirror, Vasquez, Bross, Whitore, Garlet. Very gravelly to stony soils.	Cryic/ Udic	30-100; much falls as snow; spring is moist	15-50	Long cold winters	Rockland and mixed high elevation vegetation. In cirques: mixed high elevation forests of subalpine fir, whitebark pine, mountain hemlock, and alpine larch. Above timberline: alpine tundra. Between forest and alpine zones: windswept Krummholz vegetation. In the Absaroka Range and Beartooth Plateau, alpine grassland, subirrigated meadows, and wetlands occurs along with rockland and mixed high elevation vegetation (see above).	Wildlife habitat, native pastureland, and recreation.
17i. Absaroka– Gallatin Volcanic Mountains	1353	Partially glaciated. Forested high mountains and hills composed of volcanics. Ash readily weathers to clay and streams are turbid as a result. Water table is often shallow; springs and wetlands occur. Percolation rates are high and storm hydrographs have long lag times between rainfall and runoff. In unglaciated areas, landslides on failed ash beds occur producing rounded hills.	5000-10000/ 1500-4000	Quaternary drift and colluvium. Tertiary pyroclastic material, volcanic flows (including andesitic and rhyolitic rock), and water-laid volcanics are common; also some Tertiary intrusive rock and near-vent, late-Cretaceous water-laid volcanics of the Livingston Formation occur.	Alfisols (Cryoboralfs), Mollisols (Cryoborolls), Inceptisols (Cryochrepts), Entisols (Cryorthents)	Worock, Woodhall, Leavitt, Garlet, Cowood, Blaine, Cheadle, Loberg, Tigeron	Cryic, Frigid/ Udic, Ustic	14-100	30-70	Long cold winters, moist springs, short summers	Subalpine fir and Douglas-fir forests.	Recreation, grazing, logging, wildlife habitat, and mining.

17. MIDDLE ROCKIES (continued)

Level IV Ecoregion		Physiography		Geology	Soil			Climate			Potential Natural Vegetation*	Land Cover and Land Use
	Area (square miles)		Elevation/ Local Relief (feet)	Surficial and Bedrock	Order (Great Group)	Common Soil Series	Temperature/ Moisture Regimes	Precipitation Mean annual (inches)	Frost Free Mean annual (days)	Mean Temperature January min/max; July min/max (°F) or Seasonality	*Source: Ross, R.L., and Hunter, H.E., 1976	
17j. Yellowstone Plateau	211	Large, intermontane valley dominated by subdued topography with lakes, springs (sometimes hot), wetland, and hilly areas.	6500-7800/ 50-1300	Quaternary alluvium, terrace deposits, colluvium, and some glacial drift.	Entisols (Cryorthents), Inceptisols (Cryochrepts), Mollisols (Cryoborolls)	Comad, Garlet, Blaine, Cowood, Slocum	Cryic/ Udic, Ustic bordering on Aridic	20-42	50	0/24; 38/80	Douglas-fir forests.	Recreation, mining, grazing, logging, and wildlife habitat.
17k. Granitic Subalpine Zone	60	Glaciated. Lake-studded, forested, high mountains. Lakes typically occur at rock fracture junctions.	8000-10100/ 150-600	Quaternary drift and colluvium. Precambrian, pre-Belt metamorphic rock. Rock outcrops.	Inceptisols (Cryochrepts, Cryumbrepts), Entisols	Shadow, Garlet, Cowood, Haverly, Vasquez	Cryic/ Udic	30-100	20-70	Long cold winters, moist springs, cool summers	Subalpine fir and Douglas-fir forests.	Wildlife habitat, and recreation.
17l. Gneissic– Schistose Forested Mountains	1294	Glaciated. Wet, forested, rugged, dissected mountains are characteristic. Rivers with low concentrations of dissolved calcium and magnesium follow rock fractures and are often clear. Slow percolation rates and short lag time between rainfall and runoff are typical. Streams have low flow during droughts and freezes. Some lakes occur.	6000-10000/ 1500-4000	Quaternary drift and colluvium. Precambrian, pre-Belt metamorphic rock. Faults are rarer in the ecoregion's eastern portion than in its western. Rock outcrops.	Inceptisols (Cryochrepts), Alfisols (Cryoboralfs), Entisols (Cryorthents)	Garlet, Cowood, Shadow, MacFarlane, Peeler	Cryic/ Ustic	20-100	30-75	Long cold winters, cool summers	Subalpine fir and Douglas-fir forests; more subalpine fir occurs in the higher, eastern portion of Ecoregion 17l than in its lower western area.	Logging, recreation, and wildlife habitat; some grazing.
17m. Dry Mid-Elevation Sedimentary Mountains	510	Semiarid, partially forested mountains.	3300-9250/ 400-3600	Sedimentary rock (often carbonate-rich) including Mississippian Madison Limestone, Ordovician Bighorn Dolomite, Cambrian Gallatin Limestone, Cambrian Gros Ventre Formation, Pennsylvanian Amsden Formation, and Pennsylvanian-Mississippian undifferentiated rocks. Rock outcrops.	Mollisols (Cryoborolls)	Duncom, Tarrete, Mayflower, Lap, Armington, Reeder, Windham	Frigid, Cryic/ Udic, Ustic	12-26	70-115	8/34; 44/90	Forest-grassland complex, foothills prairie, and Rocky Mountain juniper, limber pine, subalpine fir, Douglas-fir, and ponderosa pine forests. Vegetation often influenced by slope orientation.	Summer grazing, wildlife habitat; also logging and mining.
17p. Foothill Potholes	1210	Mostly treeless foothills below heavily glaciated mountain canyons characterized by hummocky moraines, outwash plains, terraces, fans, poorly developed drainage networks, and many wildlife-rich pothole lakes and wetlands.	3600-5400/ 150-1000	Extensive Quaternary glacial drift and alluvial deposits; also some Cretaceous sediments.	Mollisols (Cryoborolls, Argiborolls, Calciborolls, Haploborolls), Inceptisols (Ustochrepts, Eutrochrepts). Well drained.	Leavitt, Burnette, Williams, Zahl, Raynesford, Hanson, Babb, Beaverton, Winspect, Kiev, Totelake, Winfall, Perma	Cryic, Frigid/ Udic, Ustic	12-24	60-100	2/34; 44/82; locally, 200+ chinooks per 100 years	Foothills prairie. Shrub- and tree-covered valleys descend into the ecoregion from adjacent high mountains. Also, subirrigated wetlands are common.	Grazing, gravel quarries, and recreation. Ranches are common.
17q. Big Snowy–Little Belt Carbonate Mountains	1791	Largely unglaciated. Isolated mountains lying east of the Rocky Mountain Front are, characteristically, rather dry, carbonate-rich, and forested.	4600-9200/ 1000-3000	Quaternary drift and colluvium. Paleozoic and Mesozoic limestone, dolomite, sandstone and shale; locally, Tertiary igneous rocks and Precambrian gneiss and schist. Rock outcrops.	Inceptisols (Ustochrepts, Cryochrepts), Alfisols (Haplustalfs, Cryoboralfs, Paleboralfs)	Whitecow, Mocmont, Whitore, Helmville, Stemple, Tigeron, Garlet	Frigid, Cryic/ Udic, Ustic	20-41	50-115	Long cold winters, moist springs; chinook frequency is about 75-200 events per 100 years	In the Little Belt Mountains: subalpine fir, Douglas-fir, and ponderosa pine forests. In the Big Snowy Mountains and eastern Little Belt Mountains: spruce and Douglas-fir forests. Climax vegetation varies according to elevation and exposure.	Logging, mining, wildlife habitat, and recreation.
17r. Scattered Eastern Igneous-Core Mountains	882	Scattered, mostly wooded, igneous-core mountains lying east of the Rocky Mountain Front. Includes the Bearpaw Mountains, Little Rocky Mountains, Sweet Grass Hills, Judith Mountains, South Moccasin Mountains, and the Highwood Mountains.	3300-7600/ 500-2100	Quaternary colluvium. Tertiary volcanic and intrusive-core mountains; also Mesozoic and Paleozoic sedimentary rocks including carbonates. Rock outcrops.	Mollisols (Haploborolls, Calciborolls, Argiborolls) Alfisols (Haplustalfs), Inceptisols (Ustochrepts, Cryochrepts), Vertisols (Haplusterts)	Hedoes, Belain, Castner, Macmeal, Whitecow, Barkof, Mocmont, Whitore, Elve, Arcette, Hughesville, Warneke, Ambrant, Perma, Winkler, Kiev, Winspect, Fairfield, Tolex	Frigid, Cryic/ Ustic	16-31	70-100	6/28; 56/90. Chinook frequency varies. Often 75-200 events per 100 years	Douglas-fir forests with ponderosa pine at 4,000-6,000 feet (depending on slope aspect) and subalpine fir above 6,500-7,000 feet. In the Sweetgrass Hills: forest-grassland complex.	Logging, grazing, wildlife habitat, and recreation.
17s. Bitterroot–Frenchtown Valley	696	Sheltered intermontane valley with floodplains, terraces, hills, fans, and thick Quaternary deposits. End moraines of alpine glaciers deposited south of Hamilton. High stream flows occur during spring when mountain snow melts. Many wildlife-rich wetlands are located near both the Bitterroot River and Clark Fork. Small side channels, sloughs, oxbow lakes, and riparian hardwood forests characterize the Bitterroot River.	3000-5000/ 25-1000	Thick Quaternary alluvial, colluvial, outwash, till, and lacustrine deposits.	Mollisols (Argiborolls, Haploborolls, Haploxerolls), Inceptisols (Xerochrepts), Alfisols (Haplustalfs, Haploxeralfs)	Fergus, Roy, Anaconda, Bitterroot, Bigarm, Perma, Victor, Yellowbay, Yourame, Woodside, Grassvalley	Frigid/ Ustic, Xeric	12-24	50-100	12/34; 46/88	Foothill prairie; also riparian hardwood forests.	Irrigated and unirrigated agriculture as well as urban/suburban/rural residential, industrial development. In late summer, parts of the Bitterroot River occasionally are nearly dewatered at the major irrigation diversions.
17t. Limy Foothill Savannah	448	Partially forested foothills with mountain-fed streams that are underlain by carbonate-rich rocks which affect stream water quality and aquatic biota.	4000-7000/ 500-2200	Mostly Mesozoic and Paleozoic sedimentary rock including carbonates.	Inceptisols (Ustochrepts, Cryochrepts), Alfisols (Haplustalfs), Mollisols (Cryoborolls, Haploborolls)	Whitecow, Mocmont, Whitore, Skaggs, Teton, Hughesville, Castle	Frigid, Cryic/ Ustic	15-21	70-100	8/32; 50/86	Eastern ponderosa forest.	Grazing, gravel quarrying, and logging. Ranches are common.
17u. Paradise Valley		NOT FINISHED										
17v. Big Belt Forested Highlands	604	Partially glaciated. These mostly forested mountains lie east of the Continental Divide and are underlain primarily by Precambrian carbonates.	4400-9500/ 600-4400	Precambrian Newland Limestone; also Tertiary igneous intrusions and Paleozoic sedimentary rocks (including carbonates). In the northwest: Precambrian Spokane and Greyson shales. High, glaciated areas underlain by intrusives.	Alfisols (Cryoboralfs, Haplustalfs, Paleboralfs), Inceptisols (Ustochrepts)	Stemple, Helmville, Mocmont, Whitecow, Trapps. Well drained.	Cryic, Frigid/ Udic, Ustic	16-40	70-110.	Long cold winters, moist springs	Subalpine fir, Douglas-fir, and ponderosa pine forests.	Grazing, logging, mining, recreation, and wildlife habitat.
17w. Townsend Basin	2676	Broad, semiarid, nearly treeless, intermontane valley with floodplains, stream terraces, alluvial fans, and areas of treeless hills.	3600-6000/ 125-1800	Quaternary alluvium, alluvial fans, and Tertiary valley fill sediments; some Precambrian Belt rocks and igneous intrusions.	Mollisols (Argiborolls, Haploborolls, Calciborolls), Inceptisols (Ustochrepts), Alfisols (Haplustalfs), Entisols (Ustifluvents, Fluvaquents)	Tolman, Hauz, Sieben, Crago, Amesha, Musselshell, Nippt, Sappington, Attewan, Scravo, Binna, Geohrock, Meadowcreek, Villy, Fairway, Brocko, Rivra, Floweree, Work, Ryell, Turner, Beaverton, Cardwell, Chinook	Frigid/ Ustic (often bordering on Aridic)	10-19	90-140	0/32; 48/86	Foothills prairie and grama–needlegrass–wheatgrass.	Cropland, rangeland, and urban-suburban-industrial activity.
17x. Rattlesnake–Blackfoot–South Swan–Northern Garnet–Sapphire Mountains	3188	Partially glaciated. Forested hills and mountains west of the Continental Divide are underlain by various types of rock. Higher peaks are mantled by volcanic ash. Lakes occur in knob and kettle moraines and in cirques.	4000-9400/ 500-4000	Quaternary drift, colluvium, ash, and alluvium. Precambrian Belt formations and Tertiary - Cretaceous igneous rock. Rock outcrops.	Inceptisols (Cryochrepts, Cryandepts, Eutrochrepts), Alfisols (Cryoboralfs, Haplustalfs, Paleboralfs), Entisols (Cryorthents)	Cowood, Stemple, Garlet, Worock, Waldbillig, Holloway, Winkler, Evaro, Helmville, Mocmont, Coerock, Winfall	Cryic, Frigid/ Udic, Ustic	16-60	30-70	Long cold winters, moist springs	Subalpine fir, Douglas-fir, and ponderosa pine forests.	Logging, recreation, and wildlife habitat.
17y. Townsend–Horseshoe– London Sedimentary Hills	486	Partially wooded, often rugged, rather dry, carbonate-rich hills and low mountains. Caverns and dry valleys occur.	4000-8200/ 300-3200	Quaternary colluvium and rock outcrops occur. Primarily folded and faulted Mesozoic and Paleozoic sedimentary rock including limestone and calcareous shale; also andesite, diorite, and Precambrian Belt rocks.	Mollisols (Calciborolls, Cryoborolls, Argiborolls), Inceptisols (Cryochrepts, Ustochrepts), Entisols (Cryorthents)	Whitore, Hanson, Tropal, Lap, Windham, Whitecow, Maiden, Crago, Pensore, Cheadle, Judell, Tolman, Judith, Rencot. Well drained.	Cryic, Frigid/ Udic, Ustic, Aridic	12-20	70-120	Long cold winters, cool moist springs	Foothills prairie, grama–needlegrass–wheatgrass, sagebrush steppe, and Douglas-fir forest.	Grazing, logging, wildlife habitat, and mining.
17z. Tobacco Root Mountains	267	Glaciated. Forested, fault-block, granitic-core mountains with lakes.	5000-9800/ 600-4300	Quaternary colluvium and drift. Precambrian pre-Belt gneissic rocks surround the Tertiary granitic-core; on the northwestern flank, folded Paleozoic and Mesozoic sedimentary formations.	Inceptisols (Cryochrepts), Mollisols (Cryoborolls), Entisols (Ustorthents), Alfisols (Cryoboralfs)	Garlet, Cowood, Shadow, Rochester, MacFarlane, Oro Fino. Often stony.	Cryic, Frigid/ Udic, Ustic	16-40	70-90	Long cold winters, moist springs	Subalpine fir and Douglas-fir forests.	Grazing, logging, mining, recreation, and wildlife habitat.
17aa. Dry Intermontane Sagebrush Valleys	2457	Broad, semiarid, treeless, intermontane valleys with stream terraces, floodplains, and alluvial fans. Grasslands, sagebrush, and saline areas occur.	4500-8600/ 200-1800	Mostly Quaternary alluvium, fan deposits, and Tertiary Bozeman Group valley-fill deposits; also Precambrian pre-Belt rocks and Tertiary volcanics.	Inceptisols (Ustochrepts), Mollisols (Argiborolls, Cryoborolls, Haploborolls, Endoaquolls), Entisols (Ustifluvents)	Crago, Scravo, Musselshell, Attewan, Kalsted, Havre, Nuly, Varney, Amesha, Rivra, Neen, Ryell, Dinnen, Cheadle, Tiban, Anaconda, Vastine, Sappington, Libeg, Maurice, Thayne, Leavitt	Frigid, Cryic/ Ustic, Aridic	9-16	70-110	2/34; 40/84	Mostly sagebrush steppe; also foothills prairie.	Mostly rangeland with some agriculture. Mining, tailings, urban, and industrial activity and related environmental impact near Butte.
17ab. Dry Gneissic–Schistose– Volcanic Hills	2253	Largely treeless, semiarid hills and alluvial fans.	4800-9600/ 600-2000	Quaternary colluvium, alluvium, gravel, glacial till, and rock outcrops occur. Typically underlain by Precambrian pre-Belt rocks and Tertiary volcanics; also Tertiary, Mesozoic, and Paleozoic sediments.	Mollisols (Cryoborolls, Calciborolls), Inceptisols (Ustochrepts), Entisols (Cryorthents)	Oro Fino, Poin, Hapgood, Varney, Nuly, Woodhall, Blaine, Leavitt, Libeg, Tiban, Hanson, Sebud, Musselshell, Amesha, Trimad, Kalsted	Cryic, Frigid/ Ustic, Udic, Aridic	12-21	30-71	Long cold winters and moist springs	Mostly sagebrush steppe; also foothills prairie.	Grazing, mining, and wildlife habitat.
17ac. Big Hole	632	Cold, subirrigated, low relief valley containing meadows, extensive wetlands, flood plains, swampy creeks, many springs and broad stream terraces. Alluvial fans also are found on the eastern periphery.	5600-7400/ usually 25-300; maximum 1200	Extensive, bouldery gravel and sandy outwash deposits of Quaternary age and Tertiary valley-fill deposits of the Bozeman Group; also Quaternary alluvium, lacustrine, glacial till, alluvial fan, and landslide deposits.	Mollisols (Cryoborolls, Cryaquolls), Entisols (Cryorthents)	Maurice, Thayne, Pishkun, Philipsburg, Slocum, Gallatin, Redchief, Bridger, Venable	Cryic/ Udic, Ustic, Aquic	12-17	30	0/28; 40/80	Mostly sagebrush steppe.	Livestock grazing; ranches are common. Many artificial drainage ditches; also gravel quarries.
17ad. Western Beaverhead Mountains		NOT FINISHED										
17ae. Forested Beaverhead Mountains	477	Glaciated. Forested, fault block mountains characterized by gentle lower slopes, and underlain by Precambrian metasedimentary Belt rocks. Many lakes, extensive till deposits, and boggy areas. Stream turbidity is low except during peak flows.	6800-9000/ 400-2000	Quaternary glacial till; also, outwash deposits, colluvium, and alluvium. Precambrian rocks including argillite, quartzite, argillaceous rocks, carbonates, and shales of the Ravalli, Piegan, and Missoula groups. Rock outcrops.	Inceptisols (Cryochrepts), Alfisols (Cryoboralfs), Mollisols (Cryoborolls), Entisols (Cryorthents). In depressions: Histosols (Cryofibrists).	Garlet, Worock, Maurice, Saltery	Cryic, Frigid/ Udic	20-41	30-50	Long cold winters, moist springs	Subalpine fir and Douglas-fir forests. In some depressions: sedge peat.	Grazing, mining, recreation, wildlife habitat, and logging.
17af. Centennial Basin	214	Cold, subirrigated, low-relief basin with grasslands, wet meadows, sand dunes, lakes, and extensive wetlands. Much of the area is in the Red Rock National Wildlife Refuge.	6500-7000/ 25-400	Quaternary alluvial fill and lacustrine deposits partly covered by sand sheets.	Mollisols (Cryaquolls, Cryoborolls, Argiborolls), Inceptisols (Cryaquepts), Histosols (Cryofibrists), Entisols (Cryorthents)	Gapo, Zohner, Babb, Teoculli, Pishkun. Often poorly drained.	Cryic/ Ustic, Aquic	12-24	50	0/24; 40/80	Sagebrush steppe.	Wildlife habitat; also grazing, recreation activity.
17ag. Pioneer– Anaconda Ranges	1286	Glaciated. These forested mountains are underlain by varied lithologies and lie southeast of the Continental Divide. Lakes can be common in several locales.	6000-9400/ 600-3000	Quaternary glacial drift and colluvium. Block faulted, metasedimentary, sedimentary, and igneous rock of various ages.	Inceptisols (Cryochrepts), Alfisols (Cryoboralfs), Entisols (Cryorthents)	Garlet, Worock, Ovando, Elkner, Cowood, Hanks, Comad	Cryic, Frigid/ Udic, Ustic	16-40	30-50	Long cold winters, moist springs	Subalpine fir and Douglas-fir forests.	Logging, grazing, recreation, mining, wildlife habitat, and rural residential development.
17ah. Eastern Pioneer Sedimentary Mountains	313	Glaciated. These rather dry, mostly forested mountains occur south of the Continental Divide. Carbonates are common and strongly affect water quality, water quantity, soils, and aquatic biota.	6000-9500/ 800-2500	Quaternary colluvium, glacial drift, and alluvium. Folded, faulted Paleozoic - Mesozoic sedimentary rocks. Limestone is common. Local granitic intrusions and zones of skarn. Rock outcrops.	Inceptisols (Cryochrepts), Mollisols (Cryoborolls), Alfisols (Cryoboralfs), Entisols (Cryorthents)	Whitore, Hanson, Woodhall, Raynesford, Leavitt, Worock, Libeg	Cryic, Frigid/ Udic, Ustic	12-20	45-70	Long cold winters, moist springs	Subalpine fir and Douglas-fir forests.	Logging, grazing, wildlife habitat, and recreation. Mining for the tungsten mineral scheelite.
17ai. Elkhorn Mountains– Boulder Batholith	1508	Partially glaciated. Mostly forested mountains and hills are underlain by mineral-rich intrusive and extrusive rocks. Local, boulder-strewn topography composed of erosion-prone granitic and andesitic rocks occur. Straddles the Continental Divide.	5000-10000/ 1000-3400	Quaternary colluvium, glacial drift, and alluvium. Cretaceous-Tertiary intrusive and extrusive rocks; granites from the Boulder Batholith and andesite-rhyolite from the Elkhorn Mountains volcanic center are common. Rock outcrops.	Inceptisols (Cryochrepts), Entisols (Cryorthents), Alfisols (Cryoboralfs, Haplustalfs), Mollisols (Cryoborolls, Argiborolls)	Cowood, Hanks, Comad, Peeler, Garlet, Worock, Farnuf, Baxendale, Mocmont, Woodhall, Leavitt, Danaher, Dinnen	Cryic, Frigid/ Udic, Ustic	12-30	50-100	Long cold winters, moist springs	Subalpine fir and Douglas-fir forests.	Logging and copper, zinc, lead, silver, and gold mining; related environmental degradation. Also, wildlife habitat and recreation.
17aj. Eastern Divide Mountains	665	Unglaciated. Mostly forested hills and mountains east of the Continental Divide are underlain by metasedimentary and volcanic rocks.	3600-8000/ 1000-3300	Quaternary colluvium and alluvium. Precambrian Belt formations; also some Tertiary volcanics and Paleozoic carbonates. Rock outcrops.	Alfisols (Haplustalfs, Cryoboralfs, Paleboralfs), Mollisols (Haploborolls, Argiborolls)	Tolex, Mocmont, Castner, Stemple, Helmville, Farnuf, Baxendale	Frigid, Cryic/ Ustic, Udic	12-25	70-110	Long cold winters, moist springs	Douglas-fir and ponderosa pine forests with subalpine fir at the highest elevations.	Grazing, logging, and wildlife habitat.
17ak. Deer Lodge– Philipsburg– Avon Grassy Intermontane Hills and Valleys	1147	Mostly treeless, intermontane valleys, stream terraces, and foothills west of the Continental Divide.	3200-6300/ 25-900	Quaternary alluvium, colluvium, and drift deposits. Undivided Tertiary basin fill deposits, Tertiary volcanics, shale and sandstone of the Cretaceous Group and Kootenai Formation, and Precambrian Belt rock.	Mollisols (Argiborolls, Haploborolls, Endoaquolls, Cryoborolls), Inceptisols (Ustochrepts), Entisols (Ustorthents)	Fergus, Matinsdale, Quiqley, Anaconda, Roy, Doney, Wayden, Perma, Shawmut, Warsing, Vastine, Yegen, Philipsburg, Cheadle, Donald, Hanson	Cryic, Frigid/ Ustic, Udic, Aridic	11-16	50-90	4/30; 44/82	Foothills prairie.	Cropland, grazing, and urban-suburban-industrial activity; related environmental degradation. The Anaconda smelter site, settling ponds, and a section of the Clark Fork with high concentrations of heavy metals are in Ecoregion 16h.
17al. Southern Garnet Sedimentary– Volcanic Mountains	382	Partially glaciated. These forested mountains on the west side of the Continental Divide are mainly composed of carbonate-rich sedimentary rock.	4700-8300/ 600-3000	Colluvium. Mostly carbonate rich, thrust faulted, tightly folded, Mesozoic - Paleozoic sedimentary formations with local granitic intrusions.	Inceptisols (Ustochrepts, Cryochrepts), Alfisols (Haplustalfs, Cryoboralfs)	Repp, Whitore, Worock, Bignell, Yourame, Helmville	Cryic, Frigid/ Udic, Ustic	16-36	70-90	Long cold winters, moist springs	Douglas-fir and ponderosa pine forests.	Logging, mining, wildlife habitat, and recreation.
17am. Flint Creek– Anaconda Mountains	814	Glaciated. Intensely folded and faulted, these forested mountains are underlain by varied rock types and lie west and north of the Continental Divide. Numerous high elevation lakes occur.	4800-9500/ 600-3500	Quaternary glacial drift, colluvium, and alluvium are common and underlain by a variety of metamorphic, sedimentary (including carbonates), and igneous rocks of different ages.	Alfisols (Cryoboralfs), Inceptisols (Cryochrepts, Ustochrepts), Entisols (Cryorthents)	Worock, Helmville, Repp, Whitore, Ovando, Elkner, Shadow, Garlet	Cryic, Frigid/ Udic, Ustic	16-50	30-70	Long cold winters, moist springs	Subalpine fir and Douglas-fir forests.	Logging, grazing, mining, recreation, wildlife habitat, and rural residential development.

18. WYOMING BASIN

Level IV Ecoregion		Physiography		Geology	Soil			Climate			Potential Natural Vegetation*	Land Cover and Land Use
	Area (square miles)		Elevation/ Local Relief (feet)	Surficial and Bedrock	Order (Great Group)	Common Soil Series	Temperature/ Moisture Regimes	Precipitation Mean annual (inches)	Frost Free Mean annual (days)	Mean Temperature January min/max; July min/max (°F)	*Source: Kuchler, 1964	
18b. Bighorn Basin	441	Dry basin composed of rolling plains, terraces, and alluvial fans.	3700-5200/ 125-600	Quaternary terrace deposits and alluvium. Tertiary Fort Union Formation and various Cretaceous sedimentary units, including the Pierre and Cody shales and the Hell Creek Formation.	Entisols (Torriorthents), Aridisols (Haplargids, Haplocalcids, Haplocambids)	Midway, Travessilla, Romberg, Harvey, Stormitt, Heldt	Frigid, Mesic/ Aridic, Ustic	6-12	100-130	12/34; 54/90	Mostly sagebrush steppe.	Mostly grazing; also some irrigated agriculture especially near the Yellowstone River.