CHAPTER 9

LTA Descriptions

Section M332E Beaverhead Mountains

This Section occurs in southwest Montana and east-central Idaho. It is part of the Southwest Montana Mountains and Valleys geomorphic area previously described. Forty seven LTAs were mapped in this Section. See Appendix F for a complete list of LTAs and their acreages. The map unit descriptions are preceded by the following illustrations:

Figure 35: Map showing location of M332E within the Northern Region

Figure 36: M332E landscape photograph, Tendoy Mountains Beaverhead-Deerlodge National Forest

Figure 37: Map showing distribution of LTAs within M332E

Figure 38 Bar chart showing abundance of landform groups within M332E

Figure 39: Bar chart showing abundance of geologic material groups within M332E

LTA10-M332En

VALLEYS: RECENT COARSE ALLUVIUM

Location: This LTA is located throughout the Snowcrest, Greenhorn and Gravelly mountain ranges and basins in southwest Montana which are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

10-M332En 3,699

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in valley bottoms and alluvial basins. The coarse alluvium is derived gneiss, metasedimentary rocks, sandstones and related rock types.

Accessory Characteristics: Dominant soils are deep to very deep coarse loams. There are minor amounts of organic soils and soils with organic surfaces. The vegetation varies from sedges, willows and wet forb types to conifers with moist forb understories. Mean annual precipitation ranges from 41 to 76 centimeters (16 to 30 inches). The elevation range is 2012 to 1622 meters (6600 to 8600 feet). The slope range is 0 to 20 percent, with dominant slopes 5 to 15 percent. This unit is slightly to moderately dissected by streams, with the stream pattern being dendritic.

LTA Components This landtype association consists of alluvial basins, and valley bottoms.

Alluvial basins are wide openings in a valley bottom drained by a meandering stream and underlain by sediments deposited by running water. Slopes range from 0 to 20 percent with dominant slopes, 2 to 15 percent. Dominant soils include Pachic Cryoborolls and Cryaquolls under mountain big sagebrush and Idaho fescue series. Under carex, willow and moist forb series the soils are Histic Cryaquolls or be Histisols. Under spruce and subalpine fir series, soils are Typic Cryochrepts. Soils are well to excessively drained. This component represents about 70 percent of the unit.

Valley bottoms are areas containing the present stream and built of sediment deposited during overflows during flood stages of past and present stream regimes. The slopes range 0 to 20 percent with dominant slopes, 2 to 15 percent. Soils are poorly developed and include Fluvents under carex and willow series. Typic Cryoborolls and Cryaquolls occur under mountain big sagebrush and Idaho fescue series. Under spruce and subalpine fir series, Typic Cryochrepts occur. Mottles can be present throughout the soil profile indicative of fluctuating water tables. Soils contain numerous rock fragments and are very gravelly or very cobbly. Stones or boulders can be present at depth in the soil. This component represents 30 percent of the unit.

Compiled by: Annie Greene, Beverhead-Deerlodge National Forest

LTA10-M332E
LTA10-M331Am
LTA10-M331Ap

VALLEYS: RECENT COARSE ALLUVIUM

Location: This LTA is located in the Beaverhead, Anaconda Pintlar, Fleecer, Pioneer, Lima, Tendoy, and Madison Ranges. These are in southwest Montana in the Jefferson and Madison Basins.

Acreage by Section

10-M332E	88,274	(Section except for M332En)
10-M331Am	5,925	
10-M331Ap	6,935	

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a valley bottom and alluvial fan landscape setting, which is typically composed of glacial outwash plains, stream terraces, and alluvial fans. Parent materials are undifferentiated deposits of silts, sands, gravels, and cobbles, which can be underlain by any bedrock.

Accessory Characteristics: The primary soils are shallow to moderately deep, gravelly loamy sands. The vegetation is a mosaic of deciduous shrubs, deciduous forest, coniferous forest, upland grasslands, and wet meadow. Mean annual precipitation ranges from 41 to 102 centimeters (16 to 40 inches). The elevation range of this LTA is 1951 to 2804 meters (6400 to 9200 feet. The dominant slope gradients are 0 to 15 percent. This LTA is slightly dissected by streams, with the dominant stream pattern being dendritic. Wetlands are a major component of this LTA.

LTA Components: This landtype association consists of glacial outwash plains, stream terraces, and alluvial fans.

Glacial outwash fans are formed in relatively coarse alluvium. Slope gradients range from 0 to 10 percent. Soils on these landforms are shallow to moderately deep, poorly developed, well to excessively drained gravelly loamy sands and sandy loams. Predominant soils are classified as Typic Cryochrepts. Rock outcrop occurs on less than one percent of this landscape component. The dominant potential natural vegetation is mountain big sagebrush and Idaho fescue series. This component represents sixty percent of this land type association.

Stream terraces are formed in mixed alluvium and reworked glacial outwash. Slope gradients range from 0 to 5 percent. Soils on these landforms are shallow to moderately deep, poorly developed, well-drained gravelly loams and sandy loams. Predominant soils are classified as Typic Cryorthents, and Typic Cryochrepts. Rock outcrop does not occur in this unit. The dominant potential natural vegetation is Douglas-fir and mountain big sage series. This component represents 20 percent of this land type association.

Alluvial fans are formed in alluvium. Slope gradients range from 5 to 15 percent. Soils on these landforms are shallow, poorly developed, well-drained gravelly sandy loams. Predominant soils are classified as Typic Cryochrepts, and Typic Cryoborolls. Rock outcrop does not occur in this unit. The dominant potential natural vegetation is mountain big sage. This component represents 20 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA12-M332E

VALLEYS: OUTWASH AND OTHER OLDER COARSE ALLUVIUM

Location: This LTA is located in foothills near the Boulder, Highland and Tobacco Root Mountains on the Beaverhead-Deerlodge National Forest. It occurs in the upper Boulder and Jefferson River basins.

Acreage by Subsection

12-M332E 50,641 (Section except for M332En)

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a valley landscape setting, which is typically composed of alluvial fans and glacial terraces. Parent materials are coarse alluvium and glacial outwash over undifferentiated bedrock.

Accessory Characterisics: The primary soils are deep with cobbly sandy and gravelly sandy and loamy textures. The vegetation is a mosaic of shublands and grasslands with a minor inclusion of coniferous forest. Mean annual precipitation ranges from 23 to 46 centimeters (9 to 18 inches). The elevation range of this LTA is 1373 to 1951 meters (4500 to 6400 feet). The dominant slopes have gradients of 5 to 15 percent. This LTA is moderately to highly dissected by intermittent streams, with the dominant stream pattern being parallel. Wetlands are a minor component of this LTA.

LTA Components: This landtype association consists of alluvial fans and glacial terraces.

Alluvial fans are formed in coarse alluvial and glacio-fluvial deposits originating from a variety of bedrock types. The majority of this LTA consists of a series of coalescing alluvial fans. Slope gradients range from 1 to 15 percent. Soils on these landforms are moderately deep to deep, weakly to moderately developed, and have cobbly and gravelly sandy loam and loam surface soils. The subsurface layers are cobbly sandy loams and loams in the less developed soils and cobbly sandy clay loams and clay loams where subsoil clay accumulation occurs, These soils are classified as Ustochrepts, Argiborolls, and Haploborolls. Rock outcrop occurs on less than 1 percent of this landscape component. The dominant potential natural vegetation is needle-and-thread grass/blue grama; bluebunch wheatgrass/blue grama; and sagebrush/bluebunch wheatgrass habitat types. This components represents 95 percent of this LTA.

Glacial terraces are formed in coarse glacio-fluvial deposits. This component is represented by one mapping unit at the mouth of Rock Creek in the upper Boulder River. Slope gradients range from 0 to 20 percent. Soils on this landform are deep, weakly to moderately developed, with cobbly, sandy and loamy textures. They are classified as Typic Cryochrepts and Cryoboralfs, and Argic and Typic Cryoborolls. Rock outcrop does not occur in this landform component. The dominant potential natural vegetation is a mosaic of Douglas fir /twinflower, dwarf huckleberry, and pinegrass; sagebrush/rough fescue; and rough fescue/Idaho fescue habitat types. This component represents 5 percent of this LTA.

Compiled by: Dave Ruppert, Beaverhead-Deerlodge National Forest

LTA12-M332En

VALLEYS: OUTWASH AND OTHER OLDER COARSE ALLUVIUM

Location: This LTA is located throughout the Greenhorn and Gravelly mountain ranges and basins. These are in southwest Montana and are drained by the Ruby and Madison rivers in the Jefferson Basin

Acreage by Section

12-M332En 10,365

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs on glacial outwash plains and is comprised glacial till dominated by granite and gneiss. Other undifferentiated competent rock types are present. This till was deposited by meltwater streams beyond the extent of glacial ice.

Accessory Characteristics: The primary soils are moderately deep to very deep, very cobbly to stony, coarse loams and sandy loams. Vegetation varies from shrublands and grasslands to conifers. Minor areas of deciduous forests occur. Elevation ranges from 1951 to 2560 meters (6400 to 8400 feet). Mean annual precipitation is 40 to 75 centimeters (16 to 30 inches). Slopes range 0 to 20 percent, with dominant slopes 5 to 15 percent. This unit is slightly dissected by streams with the stream pattern being dendritic.

LTA Components: This landtype association consists of glacial outwash plains.

Glacial outwash plains are dominated on the surface by undifferentiated stone to boulder size glacial till. Granite and gneiss are the dominant parent materials. Dominant soils are Typic Cryoborolls under mountain big sagebrush and Idaho fescue series. Under Douglss-fir and subalpine fir series, Typic Cryochrepts are present. Slopes range 0 to 20 percent with dominant slopes 5 to 15 percent.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA13-M332En

VALLEYS: FINE GLACIAL SEDIMENTS

Location This LTA is located throughout the Snowcrest and Gravelly mountain ranges and basins in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

13-M332En 12,914

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs on glacial outwash plains and is contains glacial till dominated by competent shales, limestones and sandstones. This till was deposited by meltwater streams beyond the extent of glacial ice.

Accessory Characteristics: The primary soils are moderately deep to very deep, very gravelly to very stony loams. Vegetation varies from shrublands, grasslands to conifers. The elevation range is 1951 to 2560 meters (6400 to 8400 feet). Mean annual precipitation is 40 to 76 centimeters (16 to 30 inches). Slope ranges from 0 to 20 percent with dominant slopes of 5 to 15 percent. The unit is moderately to highly dissected by streams with the stream pattern being dendritic.

LTA Components: This landtype association consists of glacial outwash plains.

Glacial outwash plains are dominated on the surface by stone sized glacial till derived from competent shales, limestones and sandstones. Dominant soils are Pachic Cryoborolls and Typic Cryoborolls under mountain big sagebrush, Idaho fescue and Douglas-fir series. Under subalpine fir series, Typic Cryocrepts are present. Slopes range from 0 to 20 percent, with dominant slopes of 5 to 15 percent.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA14-M332En

VALLEYS: RECENT FINE ALLUVIUM

Location: This LTA is located throughout the Snowcrest and Gravelly mountain ranges and basins in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

14-M332En 11,728

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in valley bottoms and alluvial basins. The fine alluvium is derived from shale, finegrained sandstone, limestone and related rocks.

Accessory Characteristics: Dominant soils are deep to very deep fine loams to clays. There are minor amounts of organic soils and soils with organic surfaces. The vegetation varies from sedges, willows and wet forb types to conifers with moist undertory forbs. Mean annual precipitation ranges from 41 to 76 centimeters (16 to 30 inches). The elevation range is 1860 to 2317 meters (6100 to 7600 feet). The slope range is 0 to 20 percent, with dominant slopes 5 to 15 percent. This LTA is highly dissected by streams, with dominant stream patterns being dendritic.

LTA Components: This landtype association consists of alluvial basins, and valley bottoms.

Alluvial basins are wide openings in a valley bottom drained by a meandering stream and underlain by sediments deposited by running water. The slope range is 0 to 20 percent, with dominant slopes 5 to 15 percent. Dominant soils include Argic Cryoborolls and Argic Pachic Cryoborolls under mountain big sagebrush, Idaho fescue, tufted hairgrass and Douglas-fir series. Under carex and moist forb series soils are Histic Cryaquolls or Histosols. Under spruce and subalpine fir series Typic Cryochrepts are present. All soils can have mottles or gleying present indicating high water tables. This component represent 60 percent of the unit.

Valley bottoms are areas containing the present stream and built of sediment deposited during overflows during flood stages of past and present stream regimes. Slopes range 0 to 20 percent, with dominant slopes 5 to 15 percent. Soils can be poorly developed and include Fluvents and Cryaquolls under carex and willow series. Under mountain big sagebrush, Idaho fescue, tufted hairgrass, and Douglas-fir series; Calcic Pachic Cryoborolls and Typic Cryoborolls are present. Typic Cryochrepts are present under spruce and subalpine fir series. Soils contain numerous rock fragments and are very gravelly to very cobbly. Stones or boulders can be present at depth in the soils. This component represent 40 percent of the unit.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA14-M332E
LTA14-M331A

VALLEYS: RECENT FINE ALLUVIUM

Location: This LTA is located in the Beaverhead, Anaconda-Pintlar, Fleecer, Pioneer, Lima, Tendoy, and Madison Ranges. These are in southwest Montana in the Jefferson and Madison Basins.

Acreage by Section

14-M332E	83,204 (all of Section except M332En)
14-M331A	12,271

LTA Setting and General Characteristics:

Differentiating Characteristics: This LTA occurs in the larger valley bottoms, which is typically composed of floodplains, glacio-fluvial wetlands, and outwash alluvium. Parent materials are recent alluvium and glacio-fluvial outwash deposits.

Accessory Characteristics: The primary soils are deep with fine textures and organics. The vegetation is a mosaic of riparian deciduous and coniferous forest, riparian shrub meadows and sedge meadows. Mean annual precipitation ranges from 50 to 102 centimeters (20 to 40 inches). The elevation range of this LTA is 2073 to 2896 meters (6800 to 9500 feet). The dominant slopes have gradients of 0 to 10 percent. This LTA is highly dissected by streams, with the dominant stream pattern being dendritic. Wetlands are a major component of this LTA.

LTA Components: This landtype association consists of floodplains, glacio-fluvial wetlands, and outwash alluvium.

The floodplains are formed in variable alluvium, typically finer and/or organic nearer the surface. Slope gradients range from less than one to four percent. Soils on these landforms are typically deep, weakly to moderately developed, poorly drained sands to silt, often with organic surface soils. These soils are classified as Histic Cryaquolls and Aquic Cryoborolls. Rock outcrop does not occur. The potential natural vegetation is a variety of riparian/wetland communities, such as willow and sedge. This component represents about 50 percent of this LTA.

Alluvial wetlands are formed in relatively fine glacial outwash and sediments, in glaciofluvial valley fill deposits. Slope gradients range from 1 to 10 percent. Soils on these landforms are deep, poorly drained, weakly to moderately developed, silt loams and silty clay loams, often with organic surface soils. These soils are classified as Histic Cryaquolls and Aquic Cumulic Cryoborolls. Rock out crop does not occur in these wetlands, but do occur in the intermingled uplands. The dominant potential natural vegetation is tufted hairgrass series. This component represents about 30 percent of this LTA.

Outwash alluvium is formed in glacial outwash and mixed alluvium and glacial outwash. Slope gradients range from 1 to 15 percent. Soils on these landforms are deep organic soils and deep, poorly drained silt loams and sandy loams. These soils are classified as Sapric Terric Medihemists and Oxyaquic Cryoborolls. Rock outcrop does not occur in this unit. The dominant potential natural vegetation is comprised of various willow and wet meadow communities. Typical potential vegetation is willow and sedges. This component represents about 20 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-DeerLodge National Forest

LTA20-M332E

BREAKS: METASEDIMENTARY (BELTS)

Location: This LTA is located in the Fleecer, Pioneer, Beaverhead, Lima, and Tendoy Ranges. These occur in southwest Montana in the Jefferson and Madison Basins.

Acreage by Section

20-M332E 72,264

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in steep, deeply eroded (rejuvenated), or faulted mountainous landscape settings, which is typically composed of structural and stream breaks. Parent materials are colluvium and residuum underlain by metamorphosed sediments of the Precambrian Belt Supergroup undifferentiated, consisting of fine to coarse grained quartzite, siltite, argillite, and carbonate and sandstone.

Accessory Characteristics: The primary soils are very shallow to moderately deep, channery and flaggy loamy sands to loams. The vegetation is a mosaic of open, coniferous forest and mountain grassland. Mean annual precipitation ranges from 41 to 102 centimeters (16 to 40 inches). The elevation range of this LTA is 2012 to 3048 meters (6600 to 10000 feet). The dominant slopes have gradients of 50 to 70 percent. This LTA is highly to moderately dissected by streams, with the dominant stream pattern being dendritic and parallel.

LTA Components: This landtype association consists of breaks.

Breaks are formed in colluvium and residuum. Slope gradients range from 40 to 75 percent. Soils on these landforms are very shallow to shallow, weakly developed, well to excessively drained, channery and flaggy loamy sands to loams. These soils are classified as Lithic and Typic Cryorthents, sandy skeletal to loamy skeletal, mixed; and Lithic and Typic Cryochrepts, loamy skeletal, mixed. Rock outcrop can account for up to a third of this landscape component. The dominant potential natural vegetation is Douglas-fir, big sagebrush, subalpine fir and whitebark pine series. This component represents 100 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead/Deerlodge National Forest

LTA21-M332E
LTA21-M332D

BREAKS: HIGHLY WEATHERED GRANITICS

Location: This LTA is located in the Anaconda-Pintlar, Fleecer, Pioneer, Boulder, Bull, Highland, and Tobacco Root Mountains on the Beaverhead -Deerlodge National Forest. These occur in southwest Montana in the Jefferson and Madison River Basins.

Acreage by Section

21-M332E	41,402
21-M332D	8,423

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in steep, deeply eroded (rejuvenated), or faulted mountainous landscape settings which is typically composed of structural and stream breaks. Parent materials are colluvium and residuum derived from moderately to highly weathered Cretaceous to Tertiary intrusive rocks undifferentiated, consisting mainly of granite, quartz monzonite, and granodiorite.

Accessory Characteristics: The primary soils are shallow to moderately deep, well drained, gravelly sandy loams. The vegetation is a mosaic of coniferous forest and mountain grasslands. Mean annual precipitation ranges from 41 to 102 centimeters (16 to 40 inches). The elevation range of this LTA is 2012 to 3048 meters (6600 to 10000 feet). The dominant slopes have gradients of 40 to 75 percent. This LTA is highly to moderately dissected by streams, with the dominant stream pattern being dendritic to parallel.

LTA Components: This landtype association consists of breaks.

Breaks are formed in colluvium and residuum. Slope gradients range from 40 to 75 percent. Soils on these landforms are shallow to moderately deep, weakly developed, well drained, channery sandy loams and loams. These soils are classified as Typic Cryorthents, and Lithic and Typic Cryochrepts. Rock outcrop accounts for up to a quarter of this landscape component. The dominant potential natural vegetation is Douglas-fir, big sagebrush, subalpine fir, and whitebark pine series. This component represents 100 percent of this LTA.

Compiled by: Dan Svoboda and Dave Ruppert, Beaverhead-DeerLodge National Forest

LTA23-M332E
LTA23-M331A

BREAKS: SCHIST AND GNEISS

Location: This LTA is located in the Lima Peaks, Tendoy, Tobacco Root, and Madison mountain ranges of the Beaverhead National Forest. These occur in southwest Montana in the Jefferson and Madison Basins.

Acreage by Section

23-M332E	23,278
23-M331A	25,213

LTA Setting and General Characteristics:

Differentiating Characteristics: This LTA occurs in a steep, deeply eroded (rejuvenated), or faulted mountainous landscape settings which is typically composed of structural and stream breaks. Parent materials are colluvium and residuum derived from Pre-Belt crystalline metamorphic rocks consisting of hornblende gneiss, quartzite, meta-diabase, sillimanite schist, quarts-feldspar gneiss, metamorphosed granite and migmatite, including the Dillon Granite-Gneiss in the Tendoy Mountains.

Accessory Characteristics: The primary soils are very shallow to moderately deep, well-drained, channery sandy loams and loams. The vegetation is a mosaic of coniferous forest and mountain grasslands. Mean annual precipitation ranges from 41 to 102 centimeters (16 to 40 inches). The elevation range of this LTA is 2012 to 3048 meters (6600 to 10000 feet). The dominant slopes have gradients of 40 to 75 percent. This LTA is highly to moderately dissected by streams, with the dominant stream pattern being dendritic to parallel. Wetlands, lakes, and ponds are not a component of this LTA.

LTA Components: This landtype association consists of breaks.

Breaks are formed in colluvium and residuum. Slope gradients range from 40 to 75 percent. Soils on these landforms are very shallow to moderately deep, well-drained, weakly developed channery sandy loams to loams. These soils are classified as Lithic and Typic Cryorthents, and Lithic and Typic Cryochrepts. Rock outcrop occurs on about 25 percent of this landscape component. The dominant potential natural vegetation is Douglas-fir, big sagebrush, subalpine fir and whitebark pine series. This component represents 100 percent of LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA25-M332E
LTA25-M331A

BREAKS: SANDSTONES AND SHALES

Location: This LTA is located in the Lima Peaks, Tendoy, Pioneer, Fleecer, and Madison mountains of the Beaverhead/Deerlodge National Forest. These occur in southwest Montana in the Jefferson and Madison Basins.

Acreage by Section

25-M332E	45,709
25-M331A	69,798

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a steep, deeply eroded (rejuvenated), or faulted mountainous landscape settings which is typically composed of structural and stream breaks. Parent materials are colluvium and residuum derived from Tertiary to Cambrian sediments undifferentiated consisting of shale, siltstone, sandstone, limestone and calcareous clays. Minor gypsum, chert, and volcanic rock occurs.

Accessory Characteristics: The primary soils are shallow to deep, well drained, flaggy loams, clay loams, and sandy loams. The vegetation is a mosaic of coniferous forest and mountain grasslands. Mean annual precipitation ranges from 41 to 102 centimeters (16 to 40 inches). The elevation range of this LTA is 1829 to 3048 meters (6000 to 10000 feet). The dominant slopes have gradients of 35 to 75 percent. This LTA is highly to moderately dissected by streams, with the dominant stream pattern being dendritic to parallel. Wetlands, seeps are a minor component of this LTA.

LTA Components: This landtype association consists of breaks.

Breaks are formed in colluvium and residuum. Slope gradients range from 20 to 65 percent. Soils on these landforms shallow to deep, well drained, weakly to moderately developed, flaggy loams, clay loams, and sandy loams. These soils are classified as Typic Cryochrepts and Typic Cryumbrepts. Rock outcrop occurs on up to 20 percent of this landscape component. The dominant potential natural vegetation is Douglas-fir, low sagebrush, big sagebrush, subalpine fir and whitebark pine series. This component represents 100 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA27-M331A

BREAKS: VOLCANICS AND CARBONATES

Location: This LTA is located in the Lima Peaks, Tendoy, Pioneer, Fleecer, Tobacco Root, and Madison mountain ranges in the Beaverhead National Forest. These occur in southwest Montana in the Jefferson and Madison Basins.

Acreage by Section

27-M332E	62,706
27-M331A	6,506

LTA Setting and General Characteristics:

Differentiating Characteristics: This LTA occurs in a steep, deeply eroded (rejuvenated), or faulted mountainous landscape setting which is typically composed of structural and stream breaks. Parent materials are colluvium and residuum derived largely from volcanics and limestone rocks of various ages.

Accessory Characteristics: The primary soils are shallow to moderately deep, well-drained channery loams. The vegetation is a mosaic of mountain grasslands and open coniferous forest. Mean annual precipitation ranges from 41 to 102 centimeters (16 to 40 inches). The elevation range of this LTA is 2012 to 2591 meters (6600 to 8500 feet). The dominant slopes have gradients of 55 to 75 percent. This LTA is moderately to highly dissected by streams, with the dominant stream pattern being dendritic to parallel. Wetlands and seeps are a minor component of this LTA.

LTA Components: This landtype association consists of breaks.

Breaks are formed in colluvium and residuum. Slope gradients range from 45 to 85 percent. Soils on these landforms are shallow, well drained, weakly developed, channery loams. These soils are classified as Lithic and Typic Cryochrepts. Rock outcrop occurs on about one third of this landscape component. The dominant potential natural vegetation is low sagebrush, curlleaf mountain mahogany and Douglas-fir series. This component represents 100 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-DeerLodge National Forest

LTA34-M332En

HIGH RELIEF MOUNTAIN SLOPES: VOLCANICS

Location: This LTA is located throughout the Snowcrest and Gravelly mountain ranges which are drained by the Ruby and Madison Rivers in the Jefferson River Basin

Acreage by Subsection

34-M332En	9,181

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in non-glacial mountain slopes and is composed of colluvium derived from rhyolitic volcanic flows, welded tuffs, and andesitic porphyry, and basalts.

Accessory Characteristics: Dominant soils are moderately deep to very deep gravelly and very cobbly loams. Vegetation varies from shrublands and grasslands to conifers. Mean annual precipitation is 51 to 102 centimeters (20 to 40 inches). Elevation ranges from 1951 to 2744 meters (6400 to 9000 feet). Slopes range from 40 to greater than 70 percent, with dominant slopes being 40 to 60 percent. This LTA is moderately to highly dissected with streams dominantly having a parallel stream pattern.

LTA Components: This landtype association consists of steep mountain slopes.

Steep mountain slopes are formed in colluvium derived from rhyolitic volcanic flows, welded tuffs and andesites. Slopes range from 40 to over 70 percent, with slopes of 40 to 60 percent predominating. Soils are moderately deep to deep with numerous rock fragments. Dominant soils include Typic Cryoborolls under mountain big sagebrush, Idaho fescue and Douglas-fir series and Typic Cryochrepts under subalpine fir and whitebark pine series. Rock outcrop occurs on 10 to 30 percent of this unit.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA35-M332En

WEAKLY GLACIATED MOUNTAIN SLOPES AND RIDGES: QUARTZITES

Location: This LTA is located throughout the Snowcrest and Gravelly mountain ranges which are drained by the Ruby and Madison Rivers in the Jefferson River Basin

Acreage by Subsection

35-M332En 19,160

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in both glacial and non-glacial mountain slopes and is composed of moderate to steep mountain slopes, glacial trough walls and ridge tops. Soils formed in colluvium and residuum derived from (non-Belt) Paleozoic quartzites. Minor amounts of sandstone and associated cherts are included.

Accessory Characteristics: Dominant soils are shallow to deep coarse sandy to loams with numerous rock fragments. Vegetation varies from shrublands and grasslands to conifers. Mean annual precipitation ranges from 51 to 102 centimeters (20 to 40 inches). Elevation ranges 2134 to 2927 meters (7000 to 9600 feet). Slopes range from 20 to greater than 60 percent, with dominant slopes 30 to 50 percent. This LTA is moderately to highly dissected with streams dominantly having a parallel stream pattern.

LTA Components: This landtype association consists of moderate to steep mountain slopes, ridge tops, and glacial trough walls.

Moderate to steep mountain slopes formed in colluvium derived from quartzites and minor amounts sandstone and associated cherts. Slopes range 20 to +60 percent, with dominant slopes 30 to 50 percent. Soils are moderately deep on steeper slope gradients. Dominant soils include Typic Cryoborolls under mountain big sagebrush, Idaho fescue and tufted hairgrass. Typic Cryochrepts occur under Douglas-fir, subalpine fir, and whitebark pine series. Dystric Cryochrepts and Typic Cryumbrepts also occur under whitebark pine series. Rock outcrop accounts for 5 to 20 percent of this component. This component represents 50 percent of the map unit

Ridge tops are formed in residuum derived from quartzites, sandstones and associated cherts. Soils are moderately deep to deep. There are minor amounts of very shallow to shallow soils. Slopes range from 0 to 20 percent, with dominant slopes 5 to 15 percent. Dominant soils include Typic Cryoborolls under Idaho fescue and tufted hairgrass series. Typic Cryumbrepts occur under alpine tundra and whitebark pine habitat types. Under subalpine fir series there are Typic Cryochrepts. Rock outcrop accounts for 5 to 20 percent of this component. This component represents 20 percent of the unit

Glacial trough walls are slopes of glacial eroded valleys. Soils are shallow to moderately deep. Slopes range from 40 to +60 percent with dominant slopes 40 to 60 percent. Dominant soils are Typic Cryochrepts under subalpine fir and whitebark pine series. Rock outcrop and talus accounts for 20 to 40 percent of this component. This component represents 20 percent of the map unit.

Compiled by: Annie Greene, Beaverhead-DeerLodge National Forest

LTA36-M332En

HIGH RELIEF MOUNTAIN SLOPES: SANDSTONES AND SHALES

Location: This LTA is located in the Snowcrest and Gravelly mountains in southwest Montana which are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

36-M332En	6,646

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in non-glaciated steep mountain slopes in colluvium derived from Mesozoic shales and siltstones with minor amounts of interbedded sandstone.

Accessory Characteristics: Dominant soils are moderately deep to deep loams to clays with numerous rock fragments. The vegetation varies from shrublands and grasslands to conifers. Mean annual precipitation ranges from 51 to 76 centimeters (20 to 30 inches). Elevations range from 2256 to 2866 meters (7400 to 9400 feet). Slopes range 45 to greater than 80 percent, dominant slopes are 50 to 70 percent. This unit is highly dissected by streams, with dominant stream patterns being parallel.

LTA Components: This landtype association consists of steep mountain slopes.

Steep mountain slopes formed in colluvium. Slopes range from 45 to +80 percent; dominant slopes are 50 to 70 percent. Soils are moderately deep to deep. Dominant soils include Typic Cryoborolls and Argic Cryoborolls under mountain big sagebrush, bluebunch wheatgrass, and Idaho fescue series. Typic Cryochrepts occur under limber pine, Douglas-fir, subalpine fir and whitebark pine series. Rock outcrops occur on 5 to 20 percent of this unit.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA37-M332En

HIGH RELIEF MOUNTAIN SLOPES: CARBONATES

Location: This LTA is located throughout the Snowcrest, Gravelly and Greenhorn mountains in southwest Montana which are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

37-M332En 33,777

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in non-glaciated mountain slopes and is composed of steep mountain slopes and ridge tops. Parent materials are colluvium derived from Cretaceous, Triassic, Paleozoic limestones with minor amounts of interbedded calcareous shales, Archaen marbles and dolomites.

Accessory Characteristics: Dominant soils are moderately deep to deep loamy soils with numerous rock fragments. The vegetation varies from mountain shrublands, grasslands, and conifers to alpine tundra. Mean annual precipitation ranges from 51 to 102 centimeters (20 to 40 inches). Elevations range 2134 to 2927 meters (7000 to 9600 feet). Slopes range from 45 to over 80 percent, with dominant slopes 50 to 70 percent. This unit is moderately to highly dissected by streams, with dominant stream patterns being dendritic to parallel.

LTA Components: This landtype association consists of steep mountain slopes, and ridge tops.

Steep mountain slopes formed in colluvium. Slopes range from 45 to +80 percent, with dominant slopes 50 to 70 percent. Soils are moderately deep to deep. Dominant soils include Calcic Cryoborolls and Argic Cryoborolls under mountain big sagebrush, bluebunch wheatgrass, Idaho fescue, limber pine and lower elevation Douglas-fir series. Under subalpine fir and white-bark pine series the dominant soils are Typic Cryoboralfs and Typic Cryochrepts. Rock outcrops occur on 5 to 20 percent of this component. This component represents 80 percent of this unit.

Ridge tops formed in residuum. Slope gradients range 2 to 30 percent. Soils are shallow to deep. Dominant soils are Lithic Cryoborolls and Calcic Cryoborolls under tufted hairgrass series and alpine tundra. Under whitebark pine series, soils are Lithic Cryochrepts and Typic Cryochrepts. Rock outcrop occurs on 5 to 20 percent of this component. This component represents 20 percent of this map unit.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA39-M332E

STEEP GLACIATED MOUNTAIN SLOPES: GNEISSES AND SCHISTS

Location: This LTA is located in the Tobacco Root Mountains of the Beaverhead-Deerlodge National Forest in southwest Montana in the Jefferson River Basin.

Acreage by Subsection

39-M332E	27,957	(Section except for M332En)

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a glaciated mountain landscape setting, which is typically composed of cirques and troughs. Parent materials are residuum underlain by gneiss and schist bedrock.

Accessory Characteristics: The primary soils are shallow and moderately deep with cobbly sandy textures. The vegetation is a mosaic of rock outcrop, scree, and coniferous forest. Mean annual precipitation ranges from 46 to 127 centimeters (18 to 50 inches). The elevation range of this LTA is 1829 to 3232 meters (6000 to 10600 feet). The dominant slopes have gradients of 60 to 100 percent. This LTA is moderately dissected by streams, with the dominant stream pattern being trellis. Wetlands are a major component of cirque basins and trough bottoms which are inclusions within this LTA.

LTA Components: This landtype association consists of cirques and troughs.

Cirques are formed in gneiss and schist bedrock. Slope gradients range from 60 to 100 percent. Soils on these landforms are shallow and moderately deep, weakly developed, with cobbly sandy textures. These soils are classified as Lithic and Typic Cryorthents and Cryochrepts. Rock outcrop and scree occur on 40 to 90 percent of this landscape component. The dominant potential natural vegetation is subalpine fir and whitebark pine series. This component represents 20 percent of this LTA.

Troughs are formed in gneiss and schist bedrock. Slope gradients range from 60 to 100 percent. Soils on these landforms are shallow and moderately deep, weakly developed, with cobbly sandy textures. These soils are classified as Lithic and Typic Cryorthents and Cryochrepts. Rock outcrop and scree occurs on 30 to 75 percent of this landscape component. The dominant potential natural vegetation is Douglas-fir, subalpine fir, and subalpine fir-whitebark pine series. This component represents 80 percent of this LTA.

Compiled by: Dave Ruppert, Beaverhead-Deerlodge National Forest

LTA39-M332En

STEEP GLACIATED MOUNTAIN SLOPES: GNEISS

Location: This LTA is located in the Snowcrest, Greenhorn and Gravelly mountain ranges in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

39-M332En 7,063

LTA Setting and Characteristics:

Differentiating Characteristics: This map unit occurs in steep glaciated mountains and is composed of cirque headwalls and glacial trough walls. Parent material is residuum and colluvium derived from Precambrian gneiss, schist, phyllites, amphibolites, metasedimentary rocks and minor components of gabbro sills and marble.

Accessory Characteristics: Dominant soils are shallow to deep course sandy loams to loams with numerous rock fragments. The vegetation varies from shrublands, grasslands to conifers. Mean annual precipitation ranges from 51 to 102 centimeters (20 to 40 inches). Elevation ranges from 2134 to 3201 meters (7000 to 10500 feet). Slopes range from 30 to greater than 70 percent. This unit is highly dissected by streams, with dominant stream patterns being parallel.

LTA components: This landtype association consists of cirque headwalls and glacial trough walls.

Cirque headwalls are steep rocky walls around a cirque basin formed by glacial erosion. Slopes range 40 to greater than 70 percent, with dominant slopes 45 to 60 percent. Soils are shallow to moderately deep with weak development. Numerous rock fragments are present. Dominant soils under mountain big sagebrush and Idaho fescue series are Typic Cryoborolls. Under Douglas-fir, subalpine fir and whitebark series; Typic Cryochrepts occur. Typic Cryumbrepts are present under whitebark pine series and alpine tundra.

Glacial trough walls slopes of glacially eroded valleys. Slopes range from 30 to over 70 percent. with dominant slopes 40 to 60 percent. Soils are shallow to moderately deep on upper trough walls and moderately deep to deep on lower troughwalls. Soils are weakly developed and have numerous rock fragments. Dominant soils under mountain big sagebrush and Idaho fescue series are Typic Cryoborolls. Under Douglas-fir, subalpine fir series and white-bark pine habitat types; Typic Cryochrepts occur. Typic Cryumbrepts are present under whitebark pine series and alpine tundra.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA40-M332E
LTA40-M331A

STEEP GLACIATED MOUNTAIN SLOPES: METASEDIMENTARY (BELTS)

Location: This LTA is located in the Lima Peaks, Pioneers, Beaverhead, and Madison mountain ranges in the Beaverhead National Forest. These are located in southwest Montana in the Jefferson and Madison Basins.

Acreage by Section

40-M332E	100,569
40-M331A	626

LTA Setting and General Characteristics:

Differentiating Characteristics: This LTA occurs in a steep, glacial landscape setting which is typically composed of glacial headwalls and troughwalls. Narrow, V-shaped trough valley bottoms and cirque basins are described under Glaciated Mountain Slopes, LTA 50. Parent materials are metamorphosed sediments of the Precambrian Y Belt Supergroup undifferentiated, consisting of fine to coarse grained quartzite, siltite, argillite, carbonate, and sandstone.

Accessory Characteristics: The primary soils are shallow, flaggy, cobbly, or gravelly loamy sands and sandy loams. The vegetation is a mosaic of coniferous forest, alpine turf, and rockland. Mean annual precipitation ranges from 41 to 102 centimeters (16 to 40 inches). The elevation range of this LTA is 2256 to 3231 meters (7400 to 10600 feet). The dominant slopes have gradients of 50 to 70 percent. This LTA is highly to moderately dissected with the dominant pattern being parallel. Wetlands/seeps are a minor component of this LTA.

LTA Components: This landtype association consists of cirque headwalls, and troughwalls.

Headwalls are formed in metasediment bedrock. They usually have well-developed avalanche chutes and rock glaciers/scree. Slope gradients range from 50 to 90 percent. Soils on these landforms are very shallow, weakly developed, flaggy loamy sands and loams. These soils are classified as Lithic and Typic Cryorthents, and Lithic and Typic Cryochrepts. Rock outcrop occurs on about 75% percent of this landscape component. The dominant potential natural vegetation is whitebark pine, and whitebark pine-subalpine fir series. This landform component represents about 15 percent of this LTA.

Troughwalls are formed in metasediment bedrock. They have thin to thick till deposits, and often have developed avalanche chutes. Slope gradients range from 45 to 70 percent. Soils on these landforms are shallow to moderately deep, weakly to moderately developed, gravelly and cobbly loamy sands, sandy loams, and loams. These soils are classified as Lithic and Typic Cryochrepts, and Entic and Typic Cryumbrepts. Rock outcrop occurs on about 35 percent of this landscape component. The dominant potential natural vegetation is whitebark pine-subalpine fir, and subalpine fir series. This landform component represents about 85 percent of this LTA.

Compiled by: Daniel J. Svoboda, Beaverhead-Deerlodge National Forest

LTA41-M332E

STEEP GLACIATED MOUNTAIN SLOPES: GRANITIC

Location: This LTA is located in the Anaconda-Pintlar, Fleecer, Pioneer, Lima Peaks, and Tobacco Root mountains in the Beaverhead/Deerlodge National Forest These occur in southwest Montana in the Jefferson and Madison Basins.

Acreage by Section

41-M332E 129,472

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a steep, glacial landscape setting which is typically composed of glacial headwalls and troughwalls. Narrow, V-shaped trough valley bottoms and cirque basins are described under glaciated Mountain Slopes: Granitics, LTA 51. Parent materials are Cretaceous to Tertiary plutonic intrusive undifferentiated, consisting mainly of granite, quartz, monzonite, and granodiorite.

Accessory Characteristics: The primary soils are shallow to moderately deep, stony, cobbly, and gravelly sandy loams and loams. The vegetation is a mosaic of coniferous forest and mountain grasslands with open stands of coniferous forest. Mean annual precipitation ranges from 46 to 102 centimeters (18 to 40 inches). The elevation range of this LTA is 2134 to 3048 meters (7000 to 10000 feet). The dominant slopes have gradients of 50 to 70 percent. This LTA is highly to moderately dissected by streams, with the dominant pattern being parallel. Wetlands and seeps are a minor component of this LTA.

LTA Components: This landtype association consists of cirque headwalls and troughwalls.

Headwalls are formed in granitic bedrock. They usually have well developed avalanche chutes and rock glaciers/scree. Slope gradients range from 50 to 90 percent. Soils on these landforms are very shallow and shallow, weakly developed, gravelly and cobbly loamy sands and loams. These soils are classified as Lithic and Typic Cryorthents, and Lithic and Typic Cryochrepts. Rock outcrop occurs on about 75 percent of this landscape component. The dominant potential natural vegetation is whitebark pine-subalpine fir, and subalpine fir series. This landform component represents about 15 percent of this LTA.

Troughwalls are formed in granitic bedrock. They have thin to deep till deposits, and often have well-developed avalanche chutes. Slope gradients range from 45 to 70 percent. Soils on these landforms are shallow to moderately deep, weakly to moderately developed, gravelly and cobbly loamy sands, sandy loams, and loams. These soils are classified as Lithic and Typic Cryochrepts. Rock outcrop occurs on about 35 percent of this landscape component. The dominant potential natural vegetation is whitebark pine-subalpine fir, and subalpine fir series. This landform component represents about 85 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA42-M332Ea

STEEP GLACIATED MOUNTAIN SLOPES: VOLCANICS

Location: This LTA is located in the Little Blackfoot River Drainage. This unit serves to break out areas influenced by extrusive volcanics from those affected by Belt Series rocks.

Acreage by Subsection

42-M332Ea	4,793

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in an alpine glaciated mountainous landscape setting which is typically composed of glacial trough walls and cirque basins and headwalls. Parent material is glacial till underlain by weakly weathered andesite and other volcanic rocks.

Accessory Characteristics: Northerly aspects and high elevation cirques have volcanic ash influenced surface soils. The primary soils are deep (except where glacially scoured in the cirques) and medium to moderately fine textured. The vegetation is a mosaic of coniferous forest and forested scree. Mean annual precipitation ranges from 50 to 113 centimeters (20 to 45 inches). The elevation range of this LTA is 1586 to 2898 meters (5200 to 9500 feet). The dominant slopes have gradients of 25 to 90 percent. This LTA is moderately dissected (moderately to widely spaced drainages) and weakly incised by streams, with the dominant stream patterns being parallel and subparallel.

LTA Components: This landtype association consists of glacial trough walls, and cirque basins and headwalls.

Glacial trough walls are formed in andesite and other volcanic rock. Slope gradients range from 60 to 90 percent. Soils on these landforms are deep or very deep, weakly to moderately developed, and have silt loam, cobbly silt loam or cobbly loam surfaces and very cobbly loam subsurface layers. These soils are classified as Typic Ustochrepts, Andic Cryochrepts and Typic Cryoboralfs. Clay development is greater on the more moderate slopes and in areas influenced by excess moisture. Rock outcrop occurs on about 30 percent of this landscape component. The dominant potential natural vegetation is Douglas-fir series on the south aspects, and subalpine fir series on north aspects. This component represents 75 percent of this LTA.

Cirque basins and headwalls are formed in andesite and other volcanic rock. Slope gradients range from 25 to greater than 60 percent. Soils on these landforms range from very shallow to very deep, are weakly developed, and have loamy surfaces and very cobbly or stony loam subsurface layers. These soils are classified as Andic Cryochrepts and Cryoboralfs. Rock outcrop occurs on about 65 percent of this landscape component. The dominant potential natural vegetation in the cirque basins is subalpine fir series. The glacially scoured headwalls are often barren or support grass/shrub vegetation. This component represents 25 percent of this LTA.

Compiled by: Larry Laing, Helena National Forest

LTA42-M332En

STEEP GLACIATED MOUNTAIN SLOPES: VOLCANICS

Location: This LTA is located throughout the Snowcrest and Gravelly mountain ranges in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

42-M332En	3,298

LTA Setting and General Characteristic:

Differentiating Characteristics: This map unit occurs in steep glaciated mountains and is composed of cirque headwalls and glacial trough walls. Parent material is residuum and colluvium derived from rhyolitic ash-flow tuffs, welded tuffs, andesitic porphyry and basalts.

Accessory Characteristics: Dominant soils are shallow to deep loams with numerous rock fragments. The vegetation varies from shrublands and grasslands to conifers. Mean annual precipitation is 51 to 102 centimeters (20 to 40 inches). Elevation ranges from 2134 to 3201 meters (7000 to 10500 feet). Slopes range from 30 to greater than 70 percent, with dominant slopes of 40 to 60 percent. This unit is highly dissected by streams, with dominant stream patterns being parallel.

LTA Components: This landtype association consists of cirque headwalls, and glacial trough walls.

Cirque headwalls are rocky steep walls around cirque basins formed by glacial erosion. Slopes range 40 to greater than 70 percent with dominant ranges 45 to 60 percent. Soils are shallow to moderately deep with weak development. Numerous rock fragments are present. Dominant soils are Typic Cryoborolls under mountain big sagebrush and Idaho fescue series. Under Douglas-fir, subalpine fir series and whitebark pine habitat types; Typic Cryochrepts are present. Rock outcrop, rock glaciers and talus occur on 20 to 40 percent of this component. This component represents 20 percent of this map unit.

Glacial troughwalls are formed in residuum and colluvium. Slopes range from 30 to greater than 70 percent, dominant slopes are 40 to 60 percent. Soils are shallow to moderately deep on upper trough walls and moderately deep to deep on lower trough walls. Soils are weakly developed and have numerous rock fragments. Dominant soils are Typic Cryoborolls under mountain big sagebrush and Idaho fescue series. Under Douglas-fir, subalpine fir, and white-bark pine series Typic Cryochrepts occur. Rock outcrop, rock glaciers and talus occur on 20 percent of this component. This component represents 80 percent of the map unit.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA43-M332Eb
LTA43-M332B

STEEP GLACIATED MOUNTAIN SLOPES: CARBONATES

Location: This LTA is located in the Anaconda and Flint Ranges, and Fleecer Mountains on the Beaverhead-Deerlodge National Forest, southwest Montana, in the upper Clark Fork River Basin.

Acreage by Subsection

43-M332Eb	3,012
43-M332B	77,618

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a glaciated mountain landscape setting, which is typically composed of cirques, troughs, and moraines. Parent materials are residuum underlain by limestone and glacial moraines deposited on limestone and a variety of other bedrock types.

Accessory Characteristics: The primary soils are shallow to deep with cobbly loamy textures. The vegetation is a mosaic of grasslands, shrublands, and coniferous forest. Mean annual precipitation ranges from 51 to 127 centimeters (20 to 50 inches). The elevation range of this LTA is 1829 to 3049 meters (6000 to 10000 feet). The dominant slopes have gradients of 25 to 80 percent. This LTA is moderately dissected by streams, with the dominant stream pattern being parallel. Wetlands are a major component of this LTA.

LTA Components: This landtype association consists of cirques and troughs, and moraines.

Cirques and troughs are formed in limestone bedrock. Slope gradients range from 45 to 100 percent. Soils on these landforms are shallow and moderately deep, weakly developed, with cobbly loamy textures. These soils are classified as Typic and Lithic Cryorthents and Cryochrepts. Rock outcrop occurs on 30 to 90 percent of this landscape component. The dominant potential natural vegetation is Douglas-fir and subalpine fir series. This component represents 40 percent of this LTA.

Moraines are composed of glacial deposits Slope gradients range from 0 to 35 percent Soils on these landforms are deep, moderately developed, with cobbly loamy textures. These soils are classified as Typic Cryochrepts and Cryoboralfs Rock outcrop does not occur on this landscape component. The dominant potential natural vegetation is sagebrush, Douglas-fir, and subalpine fir series The dominant vegetation in wetlands is willow, sedge, and subalpine fir series. This component represents 60 percent of this LTA.

Compiled by: Dave Ruppert, Beaverhead-Deerlodge National Forest

LTA43-M332E

STEEP GLACIATED MOUNTAIN SLOPES: CARBONATES

Location: This LTA is located throughout the Snowcrest and Gravelly mountains of southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

43-M332E 6,435 (Section except for M332Eb)

LTA Setting and General Characteristic:

Differentiating Characteristics: This map unit occurs in gentle to steeply sloping glaciated mountains and is composed of cirque headwalls, glacial trough walls, cirque basins, moraines and trough valley bottoms. Parent material is residuum and colluvium derived from Cretaceous, Triassic, and Paleozoic limestones with minor amounts of interbedded calcareous shales, Archean marbles, dolomites and associated cherts.

Accessory Characteristics: Dominant soils are shallow to deep, loams to clay loams. Numerous rock fragments are present with stone to boulder size glacial till. Soils with organic surfaces and organics occur in depressional areas under sedges and moist forbs. Vegetation varies from shrublands and grasslands to conifers. Mean annual precipitation is 51 to 102 cms (20 to 40 inches). Elevation ranges from 2134 to 2866 (7000 to 9400 feet). Slopes range from 0 to greater than 70 percent, with dominant slopes of 10 to 60 percent. This unit is moderately to highly dissected by streams. The dominant stream patterns are dendritic to parallel, depending on slope.

LTA Components: This landtype association consists of cirque headwalls glacial trough walls, cirque basins, moraines, and trough valley bottoms.

Cirque headwalls are steep rocky walls around a cirque basin formed by glacial erosion. Slopes range 40 to greater than 70 percent with dominant ranges being 45 to 60 percent. Soils are shallow to moderately deep with weak development. Numerous rock fragments are present. Dominant soils are Typic Cryoborolls and Calcic Cryoborolls under mountain big sagebrush and Idaho fescue series. Under Douglas-fir, subalpine fir and white-bark pine series, Typic Cryochrepts are present. Rock outcrop, rock glaciers and talus occur on 20 to 40 percent of this component. This component represents 15 percent of this map unit.

Glacial trough walls are slopes of glacially eroded valleys. Slopes range from from 30 to greater than 70 percent with the dominant slopes being 40 to 60 percent. Soils are shallow to moderately deep on upper trough walls and moderately deep to deep on lower trough walls. Soils are weakly developed and have numerous rock fragments. Dominant soils are Typic Cryoborolls and Calcic Cryoborolls under mountain big sagebrush and Idaho fescue series. Under Douglas-fir, subalpine fir and white-bark pine series, Typic Cryochrepts occur. Rock outcrop, rock glaciers and talus occur on 20 percent of this component. This component represents 30 percent of the map unit.

Cirque basins are large hollows scooped out at the head of valleys by glacial erosion. Soils are moderately deep to deep. Slopes range from 0 to 30 percent with dominant slopes being 5 to 20 percent. Dominant soils include Argic Cryoborolls and Pachic Cryoborolls under mountain big sagebrush, Idaho fescue, and tufted hairgrass series. Histic Cryaquolls and Histosols occur under sedge, willow and moist forb series. Typic Cryoboralfs and Typic Cryochrepts occur under Douglas-fir, subalpine fir and white-bark pine series. Stone to boulder size glacial till is on the surface. Rock outcrop occupies 10 to 30

percent of this component. This component represents 15 percent of this map unit.

Moraines are undulating areas formed by glacial drift. Soils are moderately deep to deep. Slopes range from 0 to 50 percent with dominant slopes being 5 to 35 percent. Dominant soils include Argic Cryoborolls and Pachic Cryoborolls under mountain big sagebrush, Idaho fescue and tufted hairgrass series. Histic Cryaquolls and Histosols occur under sedge, willow and moist forbs. Typic Cryoboralfs and Typic Cryochrepts occur under Douglas-fir, subalpine fir, and white-bark pine series. Stone to boulder size glacial till is on the surface. Rock outcrop occupies 10 to 30 percent of this component. This component represents 25 percent of this map unit.

Trough valley bottoms formed in glacio-fluvial sediments. Soils are deep. Slopes range from 0 to 20 percent with dominant slopes being 5 to 15 percent. Dominant soils include Typic Cryoborolls, Typic Cryaquolls, and Fluvents under mountain big sagebrush, Idaho fescue and tufted haigrass series. Histic Cryaquolls and Histosols occur under sedge, willow and moist forbs. Typic Cryochrepts and Fluvents occur under Douglas-fir, subalpine fir and white-bark pine series. This component represents 15 percent of this map unit.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA44-M332En

STEEP GLACIATED MOUNTAIN SLOPES: SANDSTONES AND SHALES

Location: This LTA is located in the Snowcrests and Gravelly mountain ranges in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

44-M332En 3,894

LTA Setting and General Characteristics:

Differentiating Characteristics: This map unit occurs in a steep glaciated mountains and is composed of cirque headwalls and glacial trough walls. Parent material is residuum and colluvium derived from Mesozoic shales and siltstones with minor amounts of interbedded sandstone.

Accessory Characteristics: Dominant soils are shallow to deep loams to clay loams with numerous rock fragments. The vegetation varies from shrublands and grasslands to conifers. Mean annual precipitation ranges from 51 to 102 centimeters (20 to 40 inches). Elevations range from 2134 to 2927 meters (7000 to 9600 feet). Slopes range from 30 to greater than 70 percent, dominant slopes are 40 to 60 percent. This unit is highly dissected by streams, with dominant stream patterns being parallel.

LTA Components This landtype association consists of cirque headwalls, and trough walls.

Cirque headwalls are walls around a cirque basin formed by glacial erosion. Slopes range 40 to greater than 70 percent with dominant slopes 45 to 60 percent. Soils are shallow to moderately deep with weak development. Numerous rock fragments are common. Dominant soils are Typic Cryoborolls under mountain big sagebrush and Idaho fescue series. Under Douglas-fir, subalpine fir and whitebark pine series Typic Cryochrepts occur. Rock outcrop, rock glaciers and talus occur on 20 to 40 percent of this component. This component represents 20 percent of this map unit.

Glacial trough walls are slopes of glacially eroded valleys. Slopes range from 30 to over 70 percent; dominant slopes are 40 to 60 percent. Soils are shallow to moderately deep on upper trough walls and moderately deep to deep on lower trough walls. Soils are weakly developed and have numerous rock fragments. Dominant soils are Typic Cryoborolls and Calcic Cryoborolls under mountain big sagebrush and Idaho fescue series. Under Douglas-fir, subalpine fir and whitebark pine series Typic Cryochrepts are present. Typic Cryumbrepts are found under whitebark pine series and alpine tundra. Rock outcrop, rock glaciers, and talus occur on 20 to 40 percent of this component. This component represents 80 percent of this map unit.

Compiled by: Annie Greene, Beaverhead/Deerlodge National Forest

LTA44-M332E
LTA44-M331A

STEEP GLACIATED MOUNTAIN SLOPES: SANDSTONES AND SHALES

Location: This LTA is located in the Pioneer, Fleecer, Lima, Tendoy, Tobacco Root, and Madison Ranges. These are drained by the Beaverhead, Big Hole, Red Rock, Ruby, and Madison rivers in the Jefferson and Madison Basins.

Acreage by Section

44-M332E	29,909 (Section except for M332En)
44-M331A	17,976

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a steep, glacial landscape setting which is typically composed of glacial headwalls and troughwalls. Narrow, V-shaped trough valley bottoms and cirque basins are described under Glaciated Mountain Slopes, LTA 53. Parent materials are Tertiary to Cambrian sediments undifferentiated, consisting of shale, siltstone, sandstone, limestone, and calcareous clays. Minor gypsum, chert, and volcanic rock occurs.

Accessory Characteristics: The primary soils are shallow to deep, stony, loams to clay loams. The vegetation is a mosaic of mountain grassland and open coniferous forest. Mean annual precipitation ranges from 41 to 102 centimeters (16 to 40 inches). The elevation range of this LTA is 2134 to 3231 meters (7000 to 10600 feet). The dominant slopes have gradients of 25 to 70 percent. This LTA is moderately to highly dissected by streams, with the dominant stream pattern being parallel. Wetlands/seeps are a minor component of this LTA.

LTA Components: This landtype association consists of headwalls and troughwalls.

Headwalls are formed in residuum. Slope gradients range from 45 to 70 percent. Soils on these landforms are shallow to moderately deep, weakly developed, stony loams to clay loams. These soils are classified as Typic and Alfic Cryochrepts. Rock outcrop occurs on about 25 percent of this landscape component. The dominant potential natural vegetation is mountain big sage, Douglas-fir, and whitebark pine-subalpine fir series. This component represents 15 percent of this LTA.

Troughwalls are formed in residuum. Slope gradients range from 25 to 70 percent. Soils on these landforms are shallow to moderately deep, weakly to moderately developed, cobbly loams and clay loams. These soils are classified as Typic and Alfic Cryochrepts, and Lithic and Typic Cryoborolls. Rock outcrop occurs on about 15 percent of this landscape component. The dominant potential natural vegetation is mountain big sage, Douglas-fir, and subalpine fir series. This component represents about 85 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA45-M332E
LTA45-M332B
LTA45-M333D

WEAKLY GLACIATED MOUNTAIN SLOPES AND RIDGES: GRANITE

Location: This unit is located in the Bitterroot and Sapphire mountain ranges of western Montana in the Bitterroot and Upper Clark Fork River Basins.

Acreage by Section

45-M332E	2,117
45-M332B	83,690
45-M333D	3,610

LTA Setting and General Characteristics

Differentiating characteristics: This map unit occurs in a high elevation broad ridgetop position which is typically composed of weakly expressed glaciated slopes and basins that were formed by ice cap glaciers, minor valley glaciers, and strong periglacial frost shattering. Parent materials are a complex of frost shattered residuum and colluvium, intermixed with glacial till derived from moderately weathered granite.

Accessory Characteristics: The primary soils are shallow to deep, coarse soils with numerous rock fragments and have a volcanic ash surface layer. The vegetation is a mosaic of coniferous forest, stunted wind-deformed forest, and occasional small wet meadows. Mean annual precipitation ranges from 102 to 140 centimeters (40 to 55 inches). The elevation range is 2073 to 2743 meters (6800 to 9000 feet). The dominant slopes have gradients of 20 to 55 percent. This unit is slightly dissected by streams, with the dominant stream pattern being dendritic. Wetlands and ponds are a minor component of this unit.

LTA Components: This landtype association consists of weakly developed glacial cirques and frost shattered mountain ridge tops.

Weakly developed glacial cirques are formed in residuum, colluvium, and till derived from a variety of rock types. Slope gradients range from 20 to 55 percent. Soils on this landform are shallow to deep and somewhat excessively drained. These soils are weakly developed and consist of extremely bouldery loam volcanic ash surface layers overlying very stony loamy sand substrata. The dominant soils are classified as Lithic and Andic Cryochrepts. Rock outcrop occurs on about 10 percent of this landscape component. The dominant potential natural vegetation is alpine larch-subalpine fir, whitebark pine-subalpine fir, and subalpine fir series. This component represents 65 percent of this unit.

Frost shattered mountain ridge tops are formed in residuum and colluvium. Slope gradients range from 20 to 50 percent. Soils on this landform are shallow to deep and somewhat excessively drained. These soils are weakly developed and consist of very stony loam volcanic ash surface layers overlying very cobbly coarse sandy loam substrata. The dominant soils are classified as Lithic and Andic Cryochrepts. Rock outcrop occurs on about 15 percent of this landscape component. The dominant potential natural vegetation is whitebark pine-subalpine fir, alpine larch-subalpine fir, and subalpine fir series. This component represents 35 percent of this unit.

Compiled by: Ken McBride, Bitterroot National Forest

LTA50-M332E

GLACIATED MOUNTAIN SLOPES: METASEDIMENTARY (BELT)

Location: This LTA is located in the Highland, Beaverhead and Pioneer Ranges on the Beaverhead/Deerlodge National Forest. These are drained by the Big Hole and Jefferson Rivers in the Jefferson Basin.

Acreage by Section

50-M332E 105,881

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a gently to moderately sloping glaciated landscape setting, which is typically composed of cirque basins and trough bottoms, glaciated slopes, and moraine. Parent materials are undifferentiated glacial drift, colluvium and residuum comprised of metamorphosed sediments of the Precambrian Y Belt Supergroup undifferentiated, consisting of fine to coarse grained quartzite, siltite, argillite, carbonate, and sandstone.

Accessory Characteristics: The primary soils are moderately deep, somewhat poorly drained, loams and clay loams; and shallow to moderately deep, well drained, gravelly and cobbly sandy loams. The vegetation is a mosaic of coniferous forest, alpine and subalpine grassland and mountain grasslands. Mean annual precipitation ranges from 36 to 102 centimeters (14 to 40 inches). The elevation range of this LTA is 1981 to 2987 meters (6500 to 9800 feet). The dominant slopes have gradients of 5 to 35 percent. This LTA is variably dissected by streams, with the dominant stream pattern being dendritic across the glaciated slopes, to deranged in the glacial till deposits. Wetlands, seeps, and ponds are a major component of this LTA.

LTA Components: This landtype association consists of cirque basins and narrow trough bottoms, glaciated slopes, and moraine.

Cirque basins and narrow trough bottoms are formed in metasediment bedrock and relatively thin glacial deposits. Slope gradients range from 5 to 35 percent. Soils on these landforms are very shallow to moderately deep, weakly to moderately well developed, rocky, well-drained sandy loams and loams on upland positions, and somewhat poorly drained loams and clay loams on lower surfaces. These soils are classified as Lithic and Typic Cryochrepts, and Aquic and Oxyaquic Cryochrepts. Rock outcrop occurs on about 15 percent of this landscape component. The dominant potential natural vegetation includes subalpine fir and sedge series. This component represents about 20 percent of this LTA.

Glaciated slopes are formed in metasediment residuum and relatively thin glacial till. Slope gradients range from 10 to 40 percent. Soils on these landforms are moderately deep, weakly to moderately developed, loams and sandy loams. These soils are classified as Typic Cryochrepts. Rock outcrop occurs on up to 35 percent of this landscape component. The dominant potential natural vegetation is Douglas-fir and subalpine fir series. This component represents about 60 percent of this LTA.

Glacial moraine is composed of metasedimentary till deposits. Slope gradients range from 0 to 35 percent. soils on these landforms are shallow to moderately deep, weakly to moderately developed, gravelly and stony loams and sandy loams. These soils are classified as Dystric and Typic Cryochrepts. Rock outcrop occurs on about 5 percent of this landscape component. The dominant potential natural vegetation is big sagebrush, Douglas-fir, and subalpine fir series. This component represents about 20 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA51-M332E
LTA51-M332D
LTA51-M331A

GLACIATED MOUNTAIN SLOPES: HARD INTRUSIVE ROCKS

Location: This unit is located in the Gallatin, Madison, and Absaroka -Beartooth mountain ranges in southwestern Montana.

Acreage by Section

51-M332Ea	11,348
51-M332Ec	2,406
51-M332Ej	5,779
51-M332Er	546
51-M332D	98,649
51-M331A	760

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit consists of gently to moderately steep glacial moraine. Soil parent material is glacial till derived from coarse grained, shallow intrusive rocks.

Accessory Characteristics: Vegetation is sparse to dense upper to lower subalpine forest, Douglas-fir forest, or mountain grassland. Elevation ranges from 1981 to 2743 meters (6500 to 9000 feet). Mean annual precipitation is 50 to greater than 125 centimeters (20 to greater than 50 inches). Slopes range from 0 to 40 percent.

LTA Components: This landtype association has three components:

Where vegetation is grassland, soils are Typic Cryoborolls and Argic Cryoborolls. These soils are deep, moderately coarse to medium textured, rocky, and have moderate fertility and water holding capacity. Rock outcrop makes up five percent of this component. Common potential natural vegetation include big sagebrush and Douglas-fir series. This component makes up 15 percent of the LTA.

Where vegetation is lower subalpine forest with some Douglas-fir forest, soils are Typic Cryochrepts. These soils are moderately coarse texture, rock, and have low fertility and water holding capacity. Rock outcrop makes up 10 percent of this component. Common potential natural vegetation is subalpine fir and Douglas-fir series. This component makes up 50 percent of the LTA.

Where vegetation is upper subalpine forest, soils are Cryochrepts intermixed with some Cryumbrepts. These soils are deep to moderately shallow, rocky, and have low fertility and water holding capacity. Rock outcrop makes up 20 to 40 percent of this component. Common potential natural vegetation issubalpine fir, whitebark pine and Idaho fescue series. This component makes up 35 percent of the LTA.

Compiled by: Henry Shovic, Gallatin National Forest

LTA51-M332E

GLACIATED MOUNTAIN SLOPES: GRANITICS

Location: This LTA is located in the Anaconda-Pintlar, Fleecer, Pioneer, and Tobacco Root Ranges, Boulder and Highland Mountains on the Beaverhead /Deerlodge National Forest. These are drained by the Big Hole, Beaverhead, Jefferson and Madison rivers in the Jefferson and Madison Basins.

Acreage by Section/Subsection

51-M332Eb	13,668
51-M332Ee	39,685
51-M332Eg	44,130
51-M332Ek	7,918

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a gently to moderately sloping glaciated landscape setting, which is typically composed of cirque basins and trough bottoms, glaciated slopes, and moraine. Parent materials are undifferentiated glacial drift, colluvium and residuum comprised of Cretaceous to Tertiary plutonic intrusives, undifferentiated, consisting mainly of granite, quartz, monzonite, and granodiorite.

Accessory Characteristics: The primary soils are moderately deep, somewhat poorly drained loams and clay loams; and shallow to moderately deep, well drained gravelly and cobbly sandy loams. The vegetation is a mosaic of coniferous forest, alpine and subalpine grassland, and mountain grassland. Mean annual precipitation ranges from 36 to 102 centimeters (14 to 40 inches). The elevation range of this LTA is 1829 to 2987 meters (6000 to 9800 feet). The dominant slopes have gradients of 5 to 35 percent. This LTA is variably dissected by streams, with the dominant stream pattern being dendritic across the glaciated slopes, to deranged in the glacial till deposits. Wetlands, seeps, and ponds are a major component of this LTA.

LTA Components: This landtype association consists of cirque basins and narrow trough bottoms, glaciated slopes, and moraine.

Cirque basins and narrow trough bottoms are formed in granitic bedrock and relatively thin glacial deposits. Slope gradients range from 5 to 60 percent. Soils on these landforms are very shallow to moderately deep, weakly to moderately well developed, well drained gravelly loamy sands, sandy loams, and loams in upland positions, and somewhat poorly drained sandy loams and loams in depressions and bottoms. These soils are classified as Lithic and Typic Cryochrepts, and Aquic and Oxyaquic Cryochrepts. Rock outcrop occurs on 15 percent of this landscape component. The dominant potential natural vegetation includes subalpine fir and spruce series. This component represents about 20 percent of this LTA.

Glaciated slopes are formed in granitic residuum and relatively thin glacial till. Slope gradients range from 10 to 60 percent. Soils on these slopes are moderately deep, weakly to moderately developed sandy loams, loams, and clay loams. These soils are classified as Typic Cryochrepts. Rock outcrop occurs on about 35 percent of this landscape component. The dominant natural potential vegetation is Douglas-fir, subalpine fir, and whitebark pine-subalpine fir series. This landscape component represents about 60 percent of this LTA.

Glacial moraine is comprised of granitic till deposition. Slope gradients range from less than 2 to 35 percent. Soils on these landforms are shallow to

moderately deep, weakly to moderately developed. gravelly and stony loamy sands, sandy loams, and loams. These soils are classified as Dystric and Typic Cryochrepts. Rock outcrop occurs on less than 1 percent of this landscape component. The dominant potential natural vegetation is big sagebrush, Douglas-fir, and subalpine fir series. This landscape component represents about 20 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA53-M332En

GLACIATED MOUNTAIN SLOPES: SANDSTONES AND SHALES

Location: This LTA is located throughout the Snowcrest and Gravelly mountain ranges and basins in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

53-M332En 6,396

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in gentle to moderately sloping glaciated mountains. It is composed of cirque basins, moraines and trough valley bottoms. Parent materials Mesozoic shales and siltstones with minor interbedded sandstone, Proterozoic shale and inclusions of quartzite and chert.

Accessory Characteristics: Dominant soils are moderately deep to deep loams to clay loams. Numerous rock fragments are present with cobble to stone size glacial till on the surface. Soils with organic surfaces and organics occur in depressional areas under sedges and moist forbs. Vegetation varies from shrublands and grasslands to conifers. Mean annual precipitation ranges from 51 to 76 centimeters (20 to 30 inches). Elevation ranges from 2134 to 2805 meters (7000 to 9200 feet). Slopes range from 0 to 50 percent; dominant slopes are 10 to 30 percent. This unit is moderately to highly dissected by streams, with dominant stream patterns being dendritic.

LTA Components: This landtype association consists of cirque basins, moraines and trough valley bottoms.

Cirque basins are large hollows scooped out of the heads of valleys by glacial erosion. Soils are moderately deep to deep. Slopes range 0 to 30 percent; with dominant slopes 5 to 20 percent. Dominant soils include Argic Cryoborolls and Pachic Cryoborolls under mountain big sagebrush, Idaho fescue and tufted hairgrass series. Histic Cryaquolls and Histosols occur under sedge, willow and moist forb series. Typic Cryoboralfs and Typic Cryochrepts occur under Douglas-fir, subalpine fir and whitebark pine series. Cobble to stone size glacial till is on the surface. Rock outcrop occupies 10 to 30 percent of this component. This component represents 30 percent of this map unit.

Moraines are undulating areas formed by glacial till. Soils are moderately deep to deep. Slopes range 0 to 50 percent; with dominant slopes 5 to 35 percent. Dominant soils include Argic Cryoborolls and Pachic Cryoborolls under mountain big sagebrush, Idaho fescue, and tufted hairgrass series. Histic Cryaquolls and Histosols occur under sedge, willow and moist forb series. Typic Cryoboralfs and Typic Cryochrepts occur under Douglas-fir, subalpine fir and whitebark pine series. Cobble to stone size glacial till is on the surface. Rock outcrop occupies 10 to 30 percent of this component. This component represents 40 percent of this map unit.

Trough valley bottoms formed in glacial-fluvial sediments. Soils are deep. Slopes range 0 to 20 percent, with dominant slopes 5 to 15 percent. Dominant soils include Typic Cryoborolls, Typic Cryaquolls, and Fluvents under mountain big sagebrush, Idaho fescue and tufted hairgrass series. Histic Cryaquolls and Histosols occur under sedge, willow and moist forb series. Typic Cryochrepts and Fluvents occur under Douglas-fir, subalpine fir and whitebark series. This component represents 20 percent of this map unit.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA53-M332E

GLACIATED MOUNTAIN SLOPES: SANDSTONES AND SHALES

Location: This LTA is located in the Lima Peaks (Bitterroot Range, Beaverhead Mountains), and Fleecer Mountains of the Beaverhead/Deerlodge National Forest in southwest Montana. These mountains are drained by Horse Prairie, Red Rock, Beaverhead, Big Hole, Ruby, and Madison rivers in the Jefferson and Madison Basins.

Acreage by Section

53-M332E	34,575	(Section except for M332En)

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a gently to moderately sloping glaciated landscape setting, composed of cirque basins and trough bottoms, glaciated slopes, and moraine. Parent materials are Tertiary to Cambrian sediments undifferentiated, consisting of shale, siltstone, sandstone, limestone, and calcareous clays. Minor gypsum, chert, and volcanic rock occurs.

Accessory Characteristics: The primary soils are shallow, rocky loams on ridges; moderately deep silt loams and silty clay loams in swales. The vegetation is a mosaic of coniferous forest, alpine and subalpine grassland, and mountain grasslands. Mean annual precipitation ranges from 36 to 102 centimeters (14 to 40 inches). The elevation range of this LTA is 1981 to 2987 meters (6500 to 9800 feet). The dominant slopes have gradients of 5 to 30 percent. This LTA is variably dissected by streams, with the dominant stream pattern being dendritic across the glaciated slopes, to deranged in the glacial till deposits. Wetlands, seeps, and ponds are a major component of this LTA.

LTA Components: This landtype association consists of cirque basins and narrow trough bottoms, glaciated slopes, and moraine.

Cirque basins and narrow trough bottoms are formed in sandstone/shale bedrock and relatively thin glacial deposits. Slope gradients range from 5 to 40 percent. Soils on these landforms are very shallow to moderately deep, moderately developed, well drained gravelly sandy loams, loams, and silt loams in the upland positions, and somewhat poorly to poorly drained sandyloams, silt loams, and silty clay loams in depressions and bottoms. These soils are classified as Typic Cryochrepts, Alfic Cryochrepts, Oxyaquic Cryoborolls, and Typic Cryoboralfs. Rock outcrop occurs on about 5 percent of this landscape component. The dominant potential natural vegetation is slender wheatgrass, tufted hairgrass, subalpine fir, and spruce series. This component represents 20 percent of this LTA.

Glaciated slopes occur on sandstone/shale residuum and relatively thin glacial till. Slope gradients range from 10 to 40 percent. Soils on these slopes are moderately deep, moderately developed sandy loams, loams, and clay loams. These soils are classified as Typic Cryochrepts, Typic Cryoborolls, and Typic Cryoboralfs. Rock outcrop occurs on about 5 percent of this landscape component. The dominant natural potential vegetation is subalpine fir, whitebark pine-subalpine fir, Douglas-fir, rough fescue and big sagebrush series. This landscape component represents about 60 percent of this LTA.

Glacial moraine is comprised of sandstone/shale till deposition. Slope gradients range from less than 2 to 35 percent. Soils on these landforms are moderately deep to deep, moderately developed, gravelly and stony sandy loams,

silt loams, and clay loams. These soils are classified as Typic Cryochrepts and Typic Cryoborolls. Rock outcrop occurs on about 5 percent of this landscape component. The dominant potential natural vegetation is big sagebrush, Douglas-fir, and subalpine fir series. This landscape component represents about 20 percent of the LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA54-M332En

GLACIATED MOUNTAIN SLOPES: VOLCANICS

Location: This LTA is located throughout the Snowcrest and Gravelly mountain ranges and basins in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

54-M332En 678

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in gentle to moderately sloping glaciated mountains. It is composed of cirque basins, moraines and trough valley bottoms. Parent materials include rhyolitic ash-flow tuffs, welded tuffs and andesite porphyry and basalt.

Accessory Characteristics: Dominant soils are moderately deep to deep loams to clay loams. Numerous rock fragments are present with stone to boulder size glacial till on the surface. Soils with organic surfaces and organics occur in depressional areas under sedges and moist forbs. Vegetation varies from shrublands and grasslands to conifers. Mean annual precipitation ranges from 51 to 76 centimeters (20 to 30 inches). Elevation ranges from 2134 to 2561 meters (7000 to 8400 feet). Slopes range from 0 to 50 percent; dominant slopes are 10 to 30 percent. This unit is moderately to highly dissected by streams, with dominant stream patterns being dendritic.

LTA Components: This landtype association consists of cirque basins, moraines and trough valley bottoms.

Cirque basins are large hollows scooped out of the heads of valleys by glacial erosion. Soils are moderately deep to deep. Slopes range from 0 to 30 percent; with dominant slopes of 5 to 20 percent. Dominant soils include Argic Cryoborolls and Pachic Cryoborolls under mountain big sagebrush, Idaho fescue and tufted hairgrass series. Histic Cryaquolls and Histosols occur under sedge, willow and moist forb series. Typic Cryoboralfs and Typic Cryochrepts occur under Douglas-fir, subalpine fir and whitebark pine series. Stone to boulder size glacial till is on the surface. Rock outcrop occupies 10 to 30 percent of this component. This component represents 30 percent of this map unit.

Moraines are undulating areas formed by glacial drift. Soils are moderately deep to deep. Slopes range 0 to 50 percent; with dominant slopes 5 to 35 percent. Dominant soils include Argic Cryoborolls and Pachic Cryoborolls under mountain big sagebrush, Idaho fescue and tufted hairgrass series. Histic Cryaquolls and Histosols occur under sedge, willow and moist forb series. Typic Cryoboralfs and Typic Cryochrepts occur under Douglas-fir, subalpine fir and whitebark pine series. Stone to boulder size glacial till is on the surface. Rock outcrop occupies 10 to 30 percent of this component. This component represents 40 percent of this map unit.

Trough valley bottoms formed in glacial-fluvial sediments. Soils are deep. Slopes range 0 to 20 percent, with dominant slopes 5 to 15 percent. Dominant soils include Typic Cryoborolls, Typic Cryaquolls, and Fluvents under mountain big sagebrush, Idaho fescue and tufted hairgrass series. Histic Cryaquolls and Histosols occur under sedge, willow and moist forb series. Typic Cryochrepts and Fluvents occur under Douglas-fir, subalpine fir and whitebark pine series. This component represents 20 percent of this map unit.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA54-M332E
LTA54-M332D

GLACIATED MOUNTAIN SLOPES: VOLCANICS

Location: This LTA is located in the Boulder Mountains on the Beaverhead-Deerlodge National Forest and the Helena National Forest. These occur in southwest Montana in the upper Jefferson River and upper Clark Fork River Basins.

Acreage by Section

54-M332E	30,482	(Section except for M332En)
54-M332D	45,449	

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a glaciated mountain landscape setting, which is typically composed of glaciated mountain slopes and moraines. Parent materials are glacial deposits and residuum underlain by volcanic bedrock.

Accessory Characteristics: The primary soils range from very deep to shallow to bedrock. They are loamy with high cobble contents especially in the subsurface layers. The vegetation is a mosaic of coniferous forest and wet meadows with the forest dominating. Mean annual precipitation ranges from 41 to 76 centimeters (16 to 30 inches). The elevation range of this LTA is 1677 to 2591 meters (5500 to 8500 feet). The dominant slopes have gradients of 10 to 50 percent. This LTA is highly dissected by streams, with the dominant stream patterns being parallel or dendritic on sideslopes with a deranged pattern locally in glacial moraines. Wetlands are a major component of this LTA.

LTA Components: This landtype association consists of moraines and glaciated mountain slopes.

Moraines are formed in volcanic glacial deposits. Volcanic ash affected loess deposits often influence surface soil characteristics. Slope gradients range from 0 to 35 percent. Soils on these landforms are very deep, moderately developed, with cobbly loam, very cobbly loam and clay loam surface textures. Very cobbly loams typify subsurface textures. These soils are classified as Typic and Aquic Cryochrepts and Cryoboralfs. Rock outcrop does not occur in this landscape component. The dominant potential natural vegetation is Douglas-fir and subalpine fir series. Meadows in this component have soils classified as Typic and Aquic Cryoborolls, and Typic Cryaquoll with willow, sedge, and tufted hairgrass. This component represents 70 percent of this LTA.

Glaciated mountain slopes are formed in volcanic bedrock. Volcanic ash affected loess deposits often influence surface soil characteristics. Slope gradients range from 20 to 50 percent. Soils on these landforms are typically shallow to moderately deep, weakly to moderately developed with cobbly loam or loam surface textures. The subsurface layers are very or extremely cobbly loams. These soils are classified as Typic and Lithic Cryochrepts and Typic Cryoboralfs. Rock outcrop occurs on about 20 percent of this landscape component. The dominant potential natural vegetation is subalpine fir, and subalpine fir-whitebark pine series. This component represents 30 percent of this LTA.

Compiled by: Dave Ruppert, Beaverhead-Deerlodge National Forest; Larry Laing, Helena National Forest

LTA57-M332Ek

GLACIATED MOUNTAIN SLOPES: GNEISSES & SCHISTS

Location: This LTA is located in the Tobacco Root mountains. It is drained by the Ruby and Madison Rivers in the Jefferson and Madison Basins.

Acreage by Subsection	
57-M332Ek	25,943

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a gently to moderately sloping glaciated landscape setting, which is typically composed of cirque basins an trough bottoms, glaciated slopes, and moraine. Parent materials are undifferentiated glacial drift, colluvium, and residuum derived from Pre-Belt crystalline metamorphic rocks consisting of hornblende gneiss, quartzite, metadiabase, sillimanite schist, quartz feldspar gneiss, metamorphosed granite and migmatite.

Accessory Characteristics: The primary soils are moderately deep, somewhat poorly drained loams and clay loams; and shallow to moderately deep, well drained, gravelly and cobbly sandy loams. The vegetation is a mosaic of coniferous forest, alpine and subalpine grassland, and mountain grassland. Mean annual precipitation ranges from 36 to 102 centimeters (14 to 40 inches). The elevation range of this LTA is about 1981 to 2987 meters (6500 to 9800 feet). The dominant slope gradient are 5 to 30 percent. This LTA is variably dissected by streams, with the dominant stream pattern being dendritic across the glaciated slopes, to deranged in the glacial till deposits. Wetlands, seeps, and ponds are a significant component of this LTA.

LTA Components: This landtype association consists of cirque basins and narrow trough bottoms, glaciated slopes, and moraine.

Cirque basins and narrow trough bottoms are formed in gneiss/schist bedrock and relatively thin glacial deposits. Slope gradients range from 5 to 40 percent. Soils on these landforms are very shallow to moderately deep, weakly to moderately developed, well drained gravelly loamy sands, sandy loams, and loams in upland positions, and somewhat poorly to poorly drained sandy loams, and silt loams in depressions and bottoms. These soils are classified as Lithic and Typic Cryochrepts, and Aquic and Oxyaquic Cryochrepts. Rock outcrop occurs on about 5 percent of this landscape component. The dominant potential natural vegetation is subalpine fir, spruce, and sedge series. This component of the landscape represents about 20 percent of the LTA.

Glaciated slopes occur on gneiss/schist residuum and relatively thin glacial till. Slope gradients range from 10 to 40 percent. Soils on these slopes are moderately deep, weakly to moderately developed sandy loams, loams, and clay loams. These soils are classified as Typic Cryochrepts and Typic Cryumbrepts. Rock outcrop occurs on about 5 percent of this landscape component. The dominant natural potential vegetation is Douglas-fir, subalpine fir, and whitebark pine-subalpine fir series. This landscape component represents about 60 percent of this LTA.

Glacial moraine is comprised of gneiss/schist till deposition. Slope gradients range from less than 2 to 35 percent. Soils on these landforms are shallow to moderately deep, weakly to moderately developed, gravelly and stony loamy sands, sandy loams, and loams. These soils are classified as Dystric and Typic Cryochrepts. Rock outcrop occurs on about 5 percent of this landscape component. The dominant potential natural vegetation is big sagebrush, Douglas-fir and subalpine fir series. This landscape component represents about 20 percent of the LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA57-M332En

GLACIATED MOUNTAIN SLOPES: GNEISS

Location: This LTA is located throughout the Greenhorn and Gravelly mountain ranges and basins in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

57-M332En 6,983

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in gentle to moderately sloping glaciated mountains. It is composed of cirque basins, moraines and trough valley bottoms. Parent materials include Precambrian gneiss, schist, phyllites, amphibolites, metasedimentary rocks with minor amounts of gabbro sills and marble.

Accessory Characteristics: Dominant soils are moderately deep to deep sandy loams to loams. Numerous rock fragments are present with stone to boulder size glacial till on the surface. Soils with organic surfaces and organics throughout occur in depressional areas under sedges and moist forbs. Vegetation varies from shrublands and grasslands to conifers. Mean annual precipitation ranges from 51 to 76 centimeters (20 to 30 inches). Elevation ranges 2134 to 2439 meters (7000 to 8000 feet). Slopes range 0 to 50 percent; dominant slopes are 10 to 30 percent. This unit is moderately to highly dissected by streams, with dominant stream pattern being dendritic.

LTA Components: This landtype association consists of cirque basins, moraines and trough valley bottoms.

Cirque basins are large hollows scooped out of heads of valleys by glacial erosion. Soils are moderately deep to deep. Slopes range 0 to 30 percent, with dominant slopes 5 to 20 percent. Dominant soils include Argic Cryoborolls and Pachic Cryoborolls under mountain big sagebrush, Idaho fescue and tufted hairgrass series. Histic Cryaquolls and Histosols occur under sedge, willow and moist forb series. Typic Cryoboralfs and Typic Cryochrepts occur under Douglas-fir, subalpine fir and whitebark pine series. Typic Cryumbrepts occur under whitebark pine series and alpine tundra. Stone to boulder size glacial till is on the surface. Rock outcrop occupies 10 to 30 percent of this component. This component represents 30 percent of this map unit.

Moraines are undulating areas formed by glacial drift. Soils are moderately deep to deep. Slopes range 0 to 50 percent, with dominant slopes 5 to 35 percent. Dominant soils include Typic Cryoborolls and Pachic Cryoborolls under mountain big sagebrush, Idaho fescue and tufted hairgrass series. Histic Cryaquolls and Histosols occur under sedge, willow and moist forb series. Typic Cryochrepts occur under Douglas-fir, subalpine fir and whitebark pine series. Stone to boulder size glacial till is on the surface. Rock outcrop occupies 10 to 30 percent of this component. This component represents 40 percent of this map unit.

Trough valley bottoms formed in glacial-fluvial sediments. Soils are deep. Slopes range 0 to 20 percent, with dominant slopes 5 to 15 percent. Dominant soils include Typic Cryoborolls, Typic Cryaquolls, and Fluvents under mountain big sagebrush, Idaho fescue and tufted hairgrass series. Histic Cryaquolls and Histosols occur under sedge, willow and moist forb series. Typic Cryochrepts and Fluvents occur under Douglas-fir, subalpine fir and white-bark pine series. This component represents 20 percent of this map unit.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA60-M332E

MOUNTAIN SLOPES AND RIDGES: METASEDIMENTARY (BELT)

Location: This LTA is located in the Anaconda Pintlar, Beaverhead Mountains, Pioneers, Fleecers, Highlands, and Lima Peaks of southwest Montana on the Beaverhead/Deerlodge National Forest. These mountains are drained by the Big Hole, Jefferson, Beaverhead, Red Rock, and Horse Prairie in the Jefferson Basin.

Acreage by Section

60-M332E 90,807

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in an unglaciated, mountain slope landscape setting, below the elevational zone of strong and moderate frost shattering. This unit is typically composed of dissected slopes with ridges and narrow, mostly ephemeral, bottoms. Parent materials are colluvium and residuum composed of and underlain by metamorphosed sediments of Precambrian Y Belt Supergroup undifferentiated, consisting of fine to coarse grained quartzite, siltite, argillite, carbonate, and sandstone.

Accessory Characteristics: The primary soils are moderately deep, well drained, dark colored sandy loams, loams, and clay loams. The vegetation is a mosaic of coniferous forest and mountain grasslands. Mean annual precipitation ranges from 30 to 76 centimeters (12 to 30 inches). The elevation range of this LTA is 1981 to 2682 meters (6500 to 8800 feet). The dominant slopes have gradients of 20 to 40 percent. This LTA is moderately to highly dissected by streams, with the dominant stream pattern being parallel. Wetlands, lakes, and ponds are a minor component of this LTA.

LTA Components: This landtype association consists of slopes with rounded ridges and narrow, steep, mostly ephemeral valley bottoms.

Mountain slopes and ridges are formed in colluvium and residuum. Slope gradients range from 10 to 60 percent. Soils on these landforms are moderately deep, moderately well developed sandy loams, loams, and clay loams. These soils are classified as Typic Cryochrepts, Typic Cryoboralfs, and Typic Cryoborolls. Rock outcrop occurs on about 10 percent of this landscape component. The dominant potential natural vegetation is big sagebrush, low sagebrush, Idaho fescue, Douglas-fir, and subalpine fir series. This component represents 98 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA61-M332E
LTA61-M332D

MOUNTAIN SLOPES AND RIDGES: HIGHLY WEATHERED GRANITICS

Location: This LTA is located in the Boulder, Elkhorn and Highland Mountains on the Beaverhead-Deerlodge National Forest and the Helena National Forest in southwest Montana. These occur in the upper Jefferson River, Prickly Pear Creek, 10 Mile Creek and Clark Fork River Basins.

Acreage by Section

61-M332E	308,903
61-M332D	251.536

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a mountain landscape setting, which is typically composed of stream dissected mountain slopes, rolling uplands and alluvial flats. Parent materials are residuum underlain by weathered granitic bedrock.

Accessory Characteristics: The primary soils are shallow to deep with gravelly sandy and loamy textures. The vegetation is a mosaic of shrublands and grasslands and coniferous forest. Small areas of aspen are common. Mean annual precipitation ranges from 30 to 76 centimeters (12 to 30 inches). The elevation range of this LTA is 1373 to 2591 meters (4500 to 8500 feet). The dominant slopes have gradients of 10 to 50 percent. This LTA is moderately or highly dissected by streams, with the dominant stream pattern being dendritic. Wetlands are a major component in this LTA on the Deerlodge National Forest.

LTA Components: This landtype association consists of stream dissected mountain slopes, rolling uplands, and alluvial flats.

Stream dissected mountain slopes are formed in weathered granitic bedrock. Slope gradients range from 10 to 50 percent. Soils on these landforms are shallow and moderately deep, weakly and moderately developed, with gravelly sandy and loamy textures. These soils are classified as Typic and Lithic Cryoborolls, Cryochrepts, Cryoboralfs, and Cryorthents. Rock outcrop occurs on about 20 percent of this landscape component. The dominant potential natural vegetation is sagebrush, Idaho fescue, Douglas-fir and subalpine fir series. This component represents 55 percent of this LTA.

Rolling uplands are formed in moderately and weakly weathered granitics granite-diorites and diorites. Slope gradients range from 10 to 40 percent. Soils on these landforms are moderately deep and deep, are weakly and moderately developed, and have sandy loam, gravelly sandy loam and loamy sand surface soils. The subsurface layers are gravelly sandy loams, gravelly loamy sands and loamy sands in the less developed soils and gravelly sandy clay loams and sandy clay loams where subsoil clay accumulation occurs. Ustochrepts, Eutroboralfs and Haploborolls prevail at the lower elevations. Typic and Lithic Cryoboralfs and Cryoborolls dominate at the mid to high elevations. Rock outcrop occurs on about 5 percent of this landscape component. Boulders are scattered on the surface on parts of the unit. The dominant potential natural vegetation is Douglas-fir series. Cooler aspects at higher elevations are dominated by Douglas-fir and subalpine fir series. The grasslands and shrublands are dominated by mountain big sagebrush and rough fescue series. Spruce series dominates the wet forest inclusions. This component represents 35 percent of this LTA.

Alluvial flats are formed in weathered granitic bedrock. Slope gradients range

from 0 to 15 percent. Soils on these landforms are deep, weakly developed, with gravelly loamy textures. These soils are classified as Oxyaquic and Typic Cryochrepts and Cryoborolls. Rock outcrop does not occur on this landscape component. The dominant potential natural vegetation is willow, sedge, spruce, and subalpine fir series. This component represents 10 percent of this LTA.

Compiled by: Dave Ruppert, Beaverhead-Deerlodge National Forest; Larry Laing, Helena National Forest

LTA62-M332E
LTA62-M332D

MOUNTAIN SLOPES AND RIDGES: WEAKLY WEATHERED GRANITICS

Location: This LTA is located in the Ten Mile Creek basin, the Elkhorn Mountains, the Big Belt Mountains, and the Continental Divide Uplands.

Acreage by Subsection

62-M332E	949
62-M332D	88,948

LTA Setting and General Characteristics:

Differentiating Characteristics: This LTA occurs in a mountainous landscape setting, which is typically composed of mountain slopes and ridges. Parent materials are residuum and colluvium underlain by granite, granitic diorite and diorite.

Accessory Characteristics: The primary soils have medium or moderately coarse textured surfaces and moderately coarse and coarse textured subsurface layers. The vegetation is a mosaic of coniferous forest and forested scree. Mean annual precipitation ranges from 50 to 75 centimeters (20 to 30 inches). The elevation range of this LTA is 1554 to 2438 meters (5100 to 8000 feet). The dominant slopes have gradients of 10 to 60 percent. This LTA is mostly undissected.

LTA Components: This landtype association consists of mountain slopes and ridges.

Mountain slopes and ridges are formed in weakly weathered granites, granite-diorites, and diorites. Higher elevations can have volcanic ash influenced surface soil. Slope gradients range from 10 to 60 percent. Soils on these landforms are extremely variable in terms of depth to bedrock, display little to no soil development and have cobbly loam, extremely cobbly sandy loam and extremely bouldery sand surface soils. Subsurface soils vary also and include extremely cobbly sandy loam, very cobbly sandy loam and extremely bouldery sand textures. These soils are mostly classified as Typic Cryochrepts and Typic Cryorthents. Boulders are scattered about the surface in portions of the unit. Rock outcrop and scree occurs on about 45 percent of this landscape component. The dominant potential natural vegetation is subalpine fir-whitebark pine series at the higher elevations with subalpine fir and Douglas-fir series on the lower slopes. This component represents 100 percent of this LTA.

Compiled by: Larry Laing, Helena National Forest

LTA63-M332En

MOUNTAIN SLOPES AND RIDGES: GNEISS

Location: This LTA is located throughout the Snowcrest, Gravelly, and Greenhorn mountains in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

63-M332En 37,136

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in non-glaciated mountain slopes and is composed of gentle to moderate slopes. Parent materials are colluvium and residuum derived from Precambrian gneiss, schists, phyllites, metasedimentary rocks and minor components of gabbro sills and marble.

Accessory Characteristics: Dominant soils are deep to very deep sandy loams to loams with numerous rock fragments. The vegetation varies from mountain shrublands and grasslands to conifers. Mean annual precipitation ranges from 40 to 102 centimeters (16 to 40 inches). The elevation range is from 1951 to 2866 meters (6400 to 9400 feet). The slope range is from 0 to 50 percent with dominant slope gradients of 10 to 40 percent. This unit is slightly to moderately dissected by streams, with dominant stream patterns being dendritic to subparallel.

LTA Components: This landtype association consists of mountain slopes.

Mountain slopes are formed in both colluvium and residuum. Slope gradients range from 0 to 50 percent, with 10 to 40 percent being dominant. Soils are deep to very deep and well developed. Dominant soils include Typic Cryoborolls under mountain big sagebrush, Idaho fescue, bluebunch wheatgrass, subalpine for meadows and lower elevation Douglas-fir series. Under higher elevation Douglas-fir, subalpine fir and whitebark series the dominant soils include Typic Cryochrepts.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA63-M332E
LTA63-M331A

MOUNTAIN SLOPES AND RIDGES: GNEISSES AND SCHISTS

Location: This LTA is located in the Tendoys, Tobacco Roots and Madison Ranges in southwest Montana. Major drainages are the Red Rock, Beaverhead, Ruby and Madison Rivers in the Jefferson Basin and Madison Basins.

Acreage by Section

63-M332E	73,719	(Section except for M332En)
63-M331A	179,717	

LTA Setting and General Characteristics:

Differentiating Characteristics: This LTA occurs in an unglaciated, mountain slope landscape setting, below the elevational zone of strong and moderate frost shattering. This unit is typically composed of dissected slopes with ridges and narrow, mostly ephemeral, bottoms. Parent materials are colluvium and residuum derived from Pre-Belt crystalline metamorphic rocks consisting of hornblende gneiss, quartzite, meta-diabase, sillimanite schist, quartz-feldspar gneiss, metamorphosed granite, and migmatite, including the Dillon Granite-Gneiss in the Tendoy Mountains.

Accessory Characteristics: The primary soils are moderately deep, well drained, dark colored, channery loams and fine sandy loams. The vegetation is a mosaic of coniferous forest and mountain grassland. Mean annual precipitation ranges from 36 to 102 centimeters (14 to 40 inches). The elevation range of this LTA is 2042 to 2652 meters (6700 to 8700 feet). The dominant slopes have gradients of 25 to 50 percent. This LTA is moderately to highly dissected by streams, with the dominant stream pattern being dendritic. Wetlands, lakes, and ponds are a minor component of this LTA.

LTA Components: This landtype association consists of slopes with rounded ridges and narrow, steep, mostly ephemeral valley bottoms.

Mountain slopes and ridges are formed in colluvium and residuum. Slope gradients range from 25 to 50 percent. Soils on these landforms are moderately deep, weakly to moderately developed, channery loams and fine sandy loams. These soils are classified as Typic Cryochrepts and Typic Cryoborolls. Rock outcrop occurs on about 5 percent of this landscape component. The dominant potential natural vegetation is big sagebrush, Douglas-fir and subalpine fir series. This landscape component represents about 98 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA64-M332E
LTA64-M332D
LTA64-M331A

MOUNTAIN SLOPES AND RIDGES: VOLCANICS

Location: This LTA is located in the Boulder, Elkhorn, Fleecer, Anaconda, Pintlar, Beaverhead, Madison, Pioneer, Lima Peaks, Tendoy, and Gallatin Mountains on the Beaverhead-Deerlodge, Helena, and Gallatin National Forests. These occur in southwest Montana in the upper Missouri River Basin and the upper Little Blackfoot drainage.

Acreage by Section

64-M332E	216,232
64-M332D	197,349
64-M331A	21,460

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a mountain landscape setting, which is typically composed of stream dissected mountain slopes and mountain ridges. Parent materials are residuum underlain by Tertiary and Cretaceous volcanic bedrock, including andesite, dacite, rhyolite, welded and non-welded rhyolite and felsic tuffs, and locally basalt and minor metagrabbro dikes.

Accessory Characteristics: The primary soils are shallow, moderately deep and deep loamy soils often with high cobble contents. The vegetation is a mosaic of coniferous forest and shrubland/grassland, coniferous forest or shrubland/grassland. Mean annual precipitation ranges from 38 to 75 centimeters (15 to 30 inches). The elevation range of this LTA is 1525 to 2378 meters (5000 to 7800 feet). The dominant slopes have gradients of 5 to 60 percent. The mountain slopes component of this LTA is moderately dissected by streams with the dominant stream patterns being parallel or dendritic. The mountain ridges are generally undissected. Wetlands are a minor component of this LTA.

LTA Components: This landtype association consists of stream dissected mountain slopes and mountain ridges.

Stream dissected mountain slopes are formed in colluvium and residuum over a variety of volcanic bedrock. Some high elevation areas are influenced by volcanic ash loess deposits. Slope gradients range from 25 to 60 percent. Soils on these landforms are shallow, moderately deep and deep to bedrock. They are moderately and weakly developed with cobbly and very cobbly loam surface textures. The subsurface layers are very cobbly and extremely cobbly loams. These soils are classified as Typic and Lithic Cryochrepts and Cryoborolls, and Typic and Mollic Cryoboralfs. Rock outcrop occurs on about 10 percent of this landscape component. The dominant potential natural vegetation is Douglas-fir and subalpine fir series. This component represents 50 percent of this LTA.

Mountain ridges are formed in residuum and colluvium over a variety of volcanic bedrock. Some high elevation areas are influenced by volcanic ash loess deposits. Included in this component is rolling uplands found in the eastern portion of the Elkhorns. Slope gradients range from 10 to 40 percent. Soils on these landforms are mostly moderately deep and shallow to bedrock. They are moderately and weakly developed with cobbly, stony and very cobbly loam or loam surface textures. The subsurface layers are very cobbly, very stony, extremely cobbly and extremely stony loams and clay loams. These soils

are mostly classified as Typic and Lithic Cryochrepts on forested sites and Argic and Lithic Cryoborolls on grassland/shrublands. Rock outcrop occurs on about 10 percent of this landscape component. The dominant potential natural vegetation is rough fescue, big sagebrush, Douglas-fir, and subalpine fir series. This component represents 50 percent of this LTA.

Compiled by: Dave Ruppert, Beaverhead-Deerlodge National Forest; Larry Laing, Helena National Forest

LTA65-M332En

MOUNTAIN SLOPES AND RIDGES: SOFT SEDIMENTARY ROCKS

Location: This LTA is located throughout the Gravelly mountains in southwest Montana which is drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

65-M332En	15,877

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit exists adjacent and on top of the Gravelly mountain range. The soils are formed in residuum derived from Mesozoic and Paleozoic shales and interbedded sandstones. There are minor amounts of limestone.

Accessory Characteristics: Dominant soils are deep to very deep fine loams to clays. The vegetation varies from shrublands, grasslands, and subalpine meadows to conifers. Mean annual precipitation ranges from 76 to 102 centimeters (30 to 40 inches). The elevation range is from 2621 to 2927 meters (8600 to 9600 feet). The slope range is 0 to 30 percent, with dominant slopes 5 to 20 percent. This unit is slightly to moderately dissected by streams, with a dendritic stream pattern.

LTA Components: This landtype association consists of gentle mountain slopes.

Gentle mountain slopes occur adjacent and on top of the mountain range. Soils are formed in residuum derived from soft sedimentary shales and interbedded sandstones, with minor components of limestone. Slopes range from 0 to 30 percent, with dominant slopes 5 to 20 percent. Dominant soils include Pachic Cryoborolls and Argic Cryoborolls under mountain big sagebrush, Idaho fescue, tufted hairgrass series and subalpine forbs. Minor amounts of Argiaquic Cryoborolls and Histosols occur under carex series. Typic Cryoboralfs occur under subalpine fir series and whitebark pine series. Mottles can be present in the soil profile indicative of high water tables.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA65-M332E
LTA65-M332D

MOUNTAIN SLOPES AND RIDGES: SOFT SEDIMENTARY ROCKS

Location: This LTA is located in nearly all the mountain ranges on the Lewis and Clark (Rocky Mountain Front, Big & Little Snowies, Crazies, Castles, and Little Belt mountains), as well as in the Fleecer and Bull Mountains in southwest Montana on the Beaverhead-Deerlodge Forest.

Acreage by Section

65-M332E	17,413
65-M332D	42,266

LTA Setting and General Characteristics:

Differentiating Characteristics: This LTA occurs on benches, basins, ridges, and valley sideslopes. Parent materials are soft sandstones and shales.

Accessory Characteristics: The primary soils are shallow, moderately deep and deep, skeletal loams and sandy loams. The vegetation is coniferous forest and fescue grassland. Mean annual precipitation ranges from 41 to 76 centimeters (16 to 30 inches). The elevation range of this LTA is 1500 to 2439 meters (5000 to 8000 feet). The dominant slopes have gradients of 10 to 60 percent. This LTA is moderately dissected with the dominant stream pattern being dendritic. Wetlands are a minor component of this LTA.

LTA Components: This landtype association consists of benches and lower valley slopes, steep valley sideslopes, and ridges and upland flats and basins.

Benches and lower valley slopes are formed in shale, sandstone, and alluvium. These landforms have slope gradients that range from 0 to 25 percent. Soils on these landforms are moderately deep and deep, well developed, and consist mainly of clay loam and clay. The major soils are classified as Typic and Vertic Cryoborolls. Rock outcrop occurs on 5 percent of this landscape component. The dominant potential natural vegetation is rough fescue and Douglas-fir series. This component represents 30 percent of this LTA.

Steep valley sideslopes are formed in shale and sandstone. These landforms have slope gradients that range from 25 to 60 percent. Soils on these landforms are moderately deep, weakly developed, and consist mainly of very gravelly and cobbly loams and sandy loams. The major soils are classified as Typic Cryoborolls and Cryoboralfs. Rock outcrop makes up less than 15 percent of this component. The dominant potential natural vegetation is rough fescue, subalpine fir, Douglas-fir and limber pine series. This component represents 35 percent of this LTA.

Ridges and upper slopes and basins are formed in sandstone and shale. These landforms have slope gradients that range from 10 to 40 percent. Soils on these landforms are extremely cobbly loams and sandy loams. The major soils are classified as Typic and Andic Cryoborolls and Cryochrepts. Rock outcrop makes up less than 15 percent of this LTA. The dominant potential natural vegetation is Douglas-fir and rough fescue series. This component represents 20 percent of this LTA.

Compiled by: Richard Saunders, Lewis and Clark National Forest

LTA66-M332Ea
LTA66-M332Dm

MOUNTAIN SLOPES AND RIDGES: CARBONATES

Location: This LTA is located in the Elkhorn and Highland Mountains on the Beaverhead-Deerlodge National Forest. These are in the Jefferson River Basin in southwest Montana.

Acreage by Subsection

66-M332Ea	4,501
66-M332Dm	19,493

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a mountain landscape setting, which is typically composed of stream dissected mountain slopes. Parent materials are residuum underlain by limestone bedrock.

Accessory Characteristics: The primary soils are shallow and moderately deep with cobbly loamy textures. The vegetation is a mosaic of coniferous forest and shrublands and grasslands. Mean annual precipitation ranges from 36 to 51 centimeters (14 to 20 inches). The elevation range of this LTA is 1677 to 2287 meters (5500 to 7500 feet). The dominant slopes have gradients of 10 to 50 percent. This LTA is moderately dissected by streams, with the dominant stream pattern being parallel. Wetlands are a minor component of this LTA.

LTA Components: This landtype association consists of stream dissected mountain slopes.

Stream dissected mountain slopes are formed in limestone bedrock. Slope gradients range from 10 to 50 percent. Soils on these landforms are shallow and moderately deep, moderately developed, and have cobbly loamy textures. These soils are classified as Typic and Lithic Cryochrepts and Cryoboralfs; and Argic and Lithic Cryoborolls. Rock outcrop occurs on about 15 percent of this landscape component. The dominant potential natural vegetation is Idaho fescue, sagebrush, Douglas-fir, and subalpine fir series. This component represents 100 percent of this LTA.

Compiled by: Dave Ruppert, Beaverhead-Deerlodge National Forest

LTA66-M332En

MOUNTAIN SLOPES AND RIDGES: CARBONATES

Location: This LTA is located throughout the Snowcrest, Gravelly, and Greenhorn mountains in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

66-M332En	34,857

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in non-glaciated mountain slopes and is composed of gentle to moderate slopes. Parent materials are colluvium and residuum derived from Cretaceous, Triassic and Paleozoic limestones with minor amounts of interbedded calcareous shales, Archean marbles, dolomites and associated cherts.

Accessory Characteristics: Dominant soils are deep to very deep loams to clay loams with numerous rock fragments. The vegetation varies from shrublands and grasslands to conifers. Mean annual precipitation ranges from 40 to 76 centimeters (16 to 30 inches). Elevation ranges from 1951 to 2866 meters (6400 to 9400 feet). Slopes range from 0 to 50 percent with dominant slope gradients 10 to 40 percent. This unit is slightly to moderately dissected by streams, with dominant stream patterns being dendritic to subparallel.

LTA Components: This landtype association consist of mountain slopes.

Mountain slopes formed in colluvium and residuum. Slopes range from 0 to 50 percent, with 10 to 40 percent being dominant. Soils are deep to very deep and well developed. Dominant soils include Calcic Cryoborolls under mountain big sagebrush, Idaho fescue, bluebunch wheatgrass and lower elevation Douglasfir series. Under higher elevation Douglas-fir, subalpine fir and whitebark pine series the dominant soils include Typic Cryochrepts. Argic Cryoborolls and Pachic Cryoborolls occur under tufted hairgrass series and forb subalpine meadows.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA68-M332En

MOUNTAIN SLOPES AND RIDGES: SANDSTONES AND SHALES

Location This LTA is located throughout the Snowcrests and Gravelly Mountain Ranges in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

68-M332En 56,509

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in non-glaciated gentle to moderate slopes. Parent material is colluvium and residuum derived from Mesozoic shales and siltstones with minor amounts of interbedded sandstone, Proterozoic shale and inclusions of quartzite and chert.

Accessory Characteristics: Dominant soils are deep to very deep loamy to fine soils with minimal rock fragments. The vegetation varies from mountain shrublands and grasslands to conifers. Mean annual precipitation ranges from 40 to 76 centimeters (16 to 30 inches). The elevation range is from 1890 to 2927 meters (6200 to 9600 feet). Slopes range from 0 to 50 percent, with dominant slope gradients 10 to 40 percent. This unit is slightly to moderately dissected by streams, with dominant stream patterns being dendritic.

LTA Components: This landtype association consists of mountain slopes.

Mountain slopes are formed in both colluvium and residuum. Slope gradients range from 0 to 50 percent, with dominant slope gradients 10 to 40 percent. Soils are deep to very deep and well developed. Dominant soils include Argic Cryoborolls, Typic Cryoborolls and Calcic Cryoborolls under mountain big sagebrush, Idaho fescue, bluebunch wheatgrass, tufted hairgrass, limber pine and Douglas-fir series. Dominant soils are Typic Cryochrepts under subalpine fir and whitebark pine series.

Compiled by: Annie Greene Beaverhead-DeerLodge National Forest

LTA68-M332E
LTA68-M331A

MOUNTAIN SLOPES AND RIDGES: SANDSTONES AND SHALES

Location: This LTA is located in the Lima Peaks (portion of Beaverhead Range), Tendoy, Pioneers, Fleecer, Tobacco Roots, and Madison Range in southwest Montana. They occur on the Beaverhead-Deerlodge National Forest in the Jefferson and Madison River Basins.

Acreage by Section

68-M332E	205,962	(Section except for M332En)
68-M331A	152,581	

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in an unglaciated, mountain slope landscape setting below the elevational zone of strong and moderate frost shattering. This unit is typically composed of dissected slopes with ridges and narrow, mostly ephemeral, bottoms. Parent materials are Tertiary to Cambrian sediments undifferentiated, consisting of shale, siltstone, sandstone, limestone, and calcareous clays. Minor gypsum, chert, and volcanic rock occurs.

Accessory Characteristics: The primary soils are moderately deep, loams, clay loams and silty clays. The vegetation is a mosaic of mountain grasslands and coniferous forests. Mean annual precipitation ranges from 41 to 91 centimeters (16 to 36 inches). The elevation range of this LTA is 1829 to 2682 meters (6000 to 8800 feet). The dominant slopes have gradients of 15 to 50 percent. This LTA is moderately to highly dissected by streams, with the dominant stream pattern being parallel, but deranged in secondary mass wasting areas. Wetlands are a major component of this LTA.

LTA Components: This landtype association consists of slopes with rounded ridges and narrow, steep, mostly ephemeral valley bottoms.

Mountain slopes and ridges are formed in colluvium-alluvium and residuum of shale and sandstone parent materials. Slope gradients range from 15 to 50 percent. Soils on these landforms are moderately deep, moderately to highly developed, dark colored, clay loams, silty clays, and sandy loams and loams. These soils are classified as Argic Pachic Cryoborolls, Typic Cryoborolls, and Mollic and Typic Cryoboralfs. Rock outcrop occurs on less than 5 percent of this landscape component. The dominant potential natural vegetation is big sagebrush, Idaho fescue, tufted hairgrass, and Douglas-fir series. This component represents 100 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA69-M332E
LTA69-M331A

PEDIMENTS: MIXED GEOLOGY

Location: This LTA is located in the Lima Peaks (Beaverhead Mountains), Tendoys, and southern Madison Range in southwest Montana in the Jefferson and Madison Basins.

Acreage by Section

69-M332E	2,408
69-M331A	412

LTA Setting and General Characteristics:

Differentiating Characteristics: This LTA occurs in an unglaciated, mountain slope landscape setting below the elevational zone of strong and moderate frost shattering. This unit is typically comprised of relatively undissected sloping and gently sloping straight to slightly concave slopes, often with a thin veneer of colluvium. Parent materials are mixed sedimentary, predominantly Cretaceous sediments consisting of shale, siltstone, sandstone, and subordinate conglomerate, limestone, and carbonaceous material, and including minor volcanic rock. The colluvial veneer is apparently Quaternary aged deposits.

Accessory Characteristics: The primary soils are shallow, well drained, gravelly loams. The vegetation is a mosaic of mountain grassland and coniferous forest. Mean annual precipitation ranges from 36 to 61 centimeters (14 to 24 inches). The elevation range of this LTA is 2042 to 2347 meters (6700 to 7700 feet). The dominant slopes have gradients of less than 20 percent. This LTA is weakly dissected by streams, with the dominant stream pattern being parallel. Wetlands, lakes, and ponds are absent in this LTA.

LTA Components: This landtype association consists of relatively long, smooth, straight to slightly concave slopes.

Pediment slopes are formed in residuum of shale, sandstone, and limestone parent material. Slope gradients range from less than 10 to 20 percent. Soils on these landforms are shallow, moderately developed, gravelly loams. These soils are classified as Lithic Calciborolls and Typic Calciborolls. Rock outcrop typically does not occur on this landscape component. The dominant potential natural vegetation is big sagebrush series. This component represents 100 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA70-M332E
LTA70-M332D

FROST SHATTERED MOUNTAIN RIDGE TOPS: METASEDIMENTARY (BELT)

Location: This LTA is located in the Fleecer, Highlands, Anaconda-Pintlar, Pioneer, Beaverhead, Tendoy, and Lima Peaks (Beaverhead Mountains) ranges. These occur in southwest Montana on the Beaverhead/Deerlodge National Forest in the Jefferson and Madison River Basins.

Acreage by Section

70-M332E	132,440
70-M332D	419

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a relatively high elevation, gently to moderately sloping, mountain landscape setting, at or above the zone of moderate and strong frost shattering. The unit is typically composed of frost shattered ridges and slopes, ranging from patterned ground to soil heaving. Parent materials are colluvium and residuum from metamorphosed sediments of the Precambrian Y Belt Supergroup, undifferentiated, consisting of fine to coarse grained quartzite, siltite, argillite, carbonate, and sandstone.

Accessory Characteristics: The primary soils are very shallow to moderately deep, channery and flaggy sandy loams and loams. The vegetation is a mosaic of alpine turf, subalpine grasslands, subalpine forest, montane coniferous forest, and mountain grassland. Mean annual precipitation ranges from 36 to 127 centimeters (14 to 50 inches). The elevation range of this LTA is 2134 to 3353 meters (7000 to 11000 feet). The dominant slopes have gradients of 25 to 50 percent. This LTA is slightly dissected by streams, with the dominant stream pattern being dendritic. Wetlands, lakes and ponds are a minor component of this unit. Some glaciated areas are included in this unit, but frost shattering has become a dominant landform process since glaciation.

LTA Components: This landtype association consists of frost shattered slopes and ridges.

Frost shattered slopes and ridges are formed in colluvium and residuum derived from metasediment rocks comprised mostly of quartzite, siltite, and argillite. Slope gradients range from 5 to 70 percent. Soils on these landforms are very shallow to moderately deep, weakly to moderately developed, stony loamy sands, sandy loams, and loams. These soils are classified as Typic and Alfic Cryorthents, and Alfic, Dystric, and Typic Cryochrepts. Rock outcrop occurs on about 15 percent of this landscape component. In the Highland Mountains, up to 50 percent of the unit is scree. The dominant potential natural vegetation is sedge, Idaho fescue, subalpine fir, whitebark pine-subalpine fir, and big sagebrush series. This component represents 98 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA71-M332E

FROST SHATTERED MOUNTAIN RIDGE TOPS: HIGHLY WEATHERED GRANITICS

Location: This LTA is located in the Lima Peaks, Beaverhead (including Anaconda-Pintlar), Pioneers, Fleecers, and Tobacco Root Mountains in southwest Montana in the Jefferson and Madison River Basins.

Acreage by Section

71-M332E	82,959

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a relatively high elevation, gently to moderately sloping mountain landscape setting, at or above the zone of moderate and strong frost shattering. The unit is typically composed of frost shattered ridges and slopes, ranging from patterned ground to soil heaving. Parent materials are colluvium and residuum from granite, quartz, monzonite, and granodiorite.

Accessory Characteristics: The primary soils are very shallow to moderately deep, gravelly and stony loamy sands, sandy loams, and loams. The vegetation is a mosaic of talus, alpine turf, alpine, subalpine and montane coniferous forest, and some mountain grasslands. Mean annual precipitation ranges from 36 to 102 centimeters (14 to 40 inches). The elevation range of this LTA is 2134 to 3048 meters (7000 to 10000 feet). The dominant slopes have gradients of 20 to 40 percent. This LTA is slightly dissected by streams, with the dominant stream pattern being dendritic. Wetlands, lakes and ponds are a minor component of this LTA.

LTA Components: This landtype association consists of frost shattered slopes and ridges.

Frost shattered slopes and ridges are formed in colluvium and residuum derived from granitic rocks. Slope gradients range from 5 to 50 percent. Soils on these landforms are very shallow to moderately deep, weakly developed, excessively to well drained, gravelly and channery loamy sands, sandy loams and loams. These soils are classified as Lithic Cryorthents, Typic Cryorthents, Lithic Cryochrepts, and Typic Cryochrepts. Rock outcrop occurs on about 20 percent of this landscape component. The dominant potential natural vegetation is white dryad, sedge, whitebark pine-subalpine fir, subalpine fir series. This component represents 98 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA72-M332E
LTA72-M332D
LTA72-M331A

FROST SHATTERED MOUNTAIN RIDGE TOPS: WEAKLY WEATHERED GRANITICS

Location: This unit is located in the Gallatin, Madison, Absaroka-Beartooth mountain ranges in southwestern Montana. Included are the Crazy Mountains, Bridger Mountains, Anaconda Mountains and Continental Divide uplands.

Acreage by Section/Subsection:

72-M332E	838
72-M331A	25,079
72-M332Dc	1,571
72-M332Dp	106

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit consists of rounded ridgetops with weak stream dissection. Soil parent material is frost shattered glacial till and colluvium derived from hard crystalline rocks such as granite.

Accessory Characteristics: Vegetation is alpine turf or sparse to dense upper subalpine and lower subalpine forest. Elevation ranges from 1981 to 2987 meters (6500 to 9800 feet). Mean annual precipitation is greater than 125 centimeters (50 inches). Slope ranges from 0 to 20 percent.

LTA Components: This landtype association has two components:

Soils on rounded ridgetops in forest are Typic and Dystric Cryochrepts. They are deep, moderately coarse textured, rocky, and have low fertility and water holding capacity. Rock outcrop makes up five percent of this component. The dominant potential natural vegetation is the subalpine fir, and subalpine fir-whitebark pine series. his component makes up 70 percent of this LTA.

Soils on rounded ridgetops with alpine turf are Dystric Cryochrepts. They are moderately deep, coarse textured, rocky, and have low fertility and water holding capacity. Rock outcrop makes up 20 percent of this component. A common potential natural vegetation series is Idaho fescue. This component makes up 30 percent of this LTA.

Compiled by: Henry Shovic, Gallatin National Forest

LTA73-M332En

FROST SHATTERED MOUNTAIN RIDGE TOPS: VOLCANICS

Location: This LTA is located throughout the Snowcrest, Gravelly, and Greenhorn mountains in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

73-M332En	1,723

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in non-glaciated mountain slopes and is composed of mountain ridge tops. Parent materials are residuum derived from rhyolitic ash-flows tuffs, welded tuffs, andesitic porphyry and basalt.

Accessory Characteristics: Dominant soils are shallow to moderately deep loams to clay loams with numerous rock fragments. The vegetation varies from subalpine meadows, conifers to alpine tundra. Mean annual precipitation ranges from 51 to 76 centimeters (20 to 30 inches). The elevation range is from 2134 to 2561 meters (7000 to 8400 feet). The slope range is from 0 to 20 percent with dominant slope gradients of 5 to 15 percent. This unit is slightly dissected by streams, with dominant stream pattern being dendritic.

LTA Components: This landtype association consists of mountain ridge tops.

Mountain ridge tops are formed in residuum. Slope gradients range from 0 to 20 percent, with dominant slopes of 5 to 15 percent. Soils are shallow to moderately
deep. Dominant soils include Typic Cryoborolls and Typic Cryochrepts under tufted hairgrass series, subalpine forbs, alpine tundra and whitebark pine series. Rock outcrop occurs on 5 to 20 percent of this unit.

Compiled by: Annie Greene. Beaverhead-Deerlodge National Forest

LTA73-M332E
LTA73-M332D

FROST SHATTERED MOUNTAIN RIDGE TOPS: VOLCANICS

Location: This LTA is located in the Fleecer, Boulder, Elkhorn, and Anaconda-Pintlar (Beaverhead Mountains) Ranges on the Beaverhead/Deerlodge National Forest. These occur in southwest Montana in the Jefferson and Madison
River Basins.

Acreage by Section

73-M332E	12,383	(Section except for M332En)
73-M332D	23,449	

LTA Setting and General Characteristics:

Differentiating Characteristics: This LTA occurs in a relatively high elevation, gently to moderately sloping mountain landscape setting at or above the zone of moderate and strong frost shattering. The unit is typically composed of frost shattered ridges and slopes, ranging from patterned ground to soil heaving. Parent materials are colluvium and residuum from mostly Tertiary volcanic rocks and volcaniclastic rocks, including andesite, dacite, and rhyolite, welded and non-welded tuffs, and locally minor metagabbro dikes.

Accessory Characteristics: The primary soils are shallow to moderately deep, channery loams and sandy loams. The vegetation is mostly subalpine coniferous forest. Mean annual precipitation ranges from 41 to 76 centimeters (16 to 30 inches). The elevation range of this LTA is 2134 to 2896 meters (7000 to 9500 feet). The dominant slopes have gradients of 5 to 20 percent. This LTA is weakly dissected by streams, with the dominant stream pattern being dendritic, or is undissected. Wetlands, lakes, and ponds are a minor component of this LTA.

LTA Components: This landtype association consists of frost shattered slopes and ridges.

Frost shattered slopes and ridges are formed in colluvium and residuum derived from volcanic rocks comprised mostly of rhyolite, welded tuffs, and andesite. Slope gradients range from 5 to 50 percent. Soils on these landforms are shallow to moderately deep, weakly to moderately developed, well drained channery loams and sandy loams and extremely cobbly loams. These soils are classified as Lithic and Typic Cryoboralfs, Lithic and Typic Cryochrepts, and Typic Cryoborolls. Rock outcrop occurs on about 10 percent of this landscape component. On the Helena NF, up to 25 percent of the unit is scree. The dominant potential natural vegetation is whitebark pinesubalpine fir, subalpine fir, rough fescue, and Idaho fescue series. This component represents 100 percentof this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA74-M332En

FROST SHATTERED MOUNTAIN RIDGE TOPS: SANDSTONES AND SHALES

Location: This LTA is located throughout the Snowcrest, Gravelly, and Greenhorn mountains in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

74-M332En 464

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in non-glaciated mountain slopes and is composed of mountain ridge tops. Parent materials are residuum derived from Mesozoic shales and siltstones with minor amounts of interbedded sandstones.

Accessory Characteristics: Dominant soils are shallow to moderately deep loams to clay loams with numerous rock fragments. The vegetation varies from subalpine meadows, alpine tundra to conifers. Mean annual precipitation ranges from 76 to 102 centimeters (30 to 40 inches). The elevation range is from 2561 to 2866 meters (8400 to 9400 feet. The slope range is from 0 to 20 percent with dominant slope gradients of 5 to 15 percent. This unit is slightly dissected by streams, with dominant stream pattern being dendritic.

LTA Components: This landtype association consists of mountain ridge tops.

Mountain ridge tops are formed in residuum. Slope gradients range from 0 to 20 percent, with dominant slopes of 5 to 15 percent. Soils are shallow to moderately
deep. Dominant soils include Typic Cryoborolls and Typic Cryochrepts under tufted hairgrass series, subalpine forbs, alpine tundra and whitebark pine series. Rock outcrop occurs on 5 to 20 percent of this unit.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA74-M332E
LTA74-M332D
LTA74-M331A

FROST SHATTERED MOUNTAIN RIDGE TOPS: SANDSTONES AND SHALES

Location: This LTA is located in the Pioneers, Fleecers, Beaverhead Mountains, Tendoys, Tobacco Root, and Madison Ranges in southwest Montana in the Jefferson and Madison Basins.

Acreage by Section

74-M332E	70,884	(Section except for M332En)
74-M332D	859	
74-M331A	10,729	

LTA Setting and General Characteristics:

Differentiating Characteristics: This LTA occurs in a relatively high elevation, gently to moderately sloping mountain landscape setting, at or above the zone of moderate and strong frost shattering. The unit is typically composed of frost shattered ridges and slopes, ranging from patterned ground to soil heaving. Parent materials are colluvium and residuum from Tertiary sediments consisting of shale, siltstone, sandstone, limestone, and calcareous clays. Minor gypsum, chert, and volcanic rocks occur.

Accessory Characteristics: The primary soils are very shallow to moderately deep silt loams, loams and clay loams. The vegetation is a mosaic of alpine turf, alpine and subalpine coniferous forest, and mountain grasslands. Mean annual precipitation ranges from 41 to 127 centimeters (16 to 50 inches). The elevation range of this LTA is 2286 to 3048 meters (7500 to 10000 feet). The dominant slopes have gradients of 10 to 40 percent. This LTA is slightly dissected by streams, with the dominant stream pattern being dendritic. Wetlands, lakes, and ponds are a minor component of this LTA.

LTA Components: This landtype association consists of frost shattered ridges and slopes.

Frost shattered ridges and slopes are formed in colluvium and residuum derived from sandstones and shales. Slope gradients range from 10 to 50 percent. Soils on these landforms are very shallow to moderately deep, weakly to moderately well developed, silt loams, loams, and clay loams. The surface soils can be highly organic above 9000 feet (2743 meters). These soils are classified as Lithic Cryoborolls and Typic Cryoborolls, Typic Cryochrepts, and Mollic Cryoboralfs. Rock outcrop occurs on about 5 percent of this landscape component. The dominant potential natural vegetation is Idaho fescue, sedge, parry's rush, whitebark pine-subalpine fir, and Douglas-fir series. This component represents 95 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA75-M332En

FROST SHATTERED MOUNTAIN RIDGE TOPS: QUARTZITES

Location: This LTA is located throughout the Snowcrest, Gravelly, and Greenhorn mountains in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

75-M332En	3,523

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in non-glaciated mountain slopes and is composed of mountain ridge tops. Parent materials are residuum derived from non-belt Paleozoic quartzites with minor amounts of sandstone and associated cherts.

Accessory Characteristics: Dominant soils are shallow to moderately deep course sandy loams to loams with numerous rock fragments. The vegetation varies from subalpine meadows and conifers to alpine tundra. Mean annual precipitation ranges from 76 to 102 centimeters (30 to 40 inches). Elevation ranges from 2561 to 2866 meters (8400 to 9400 feet). The slope range is from 0 to 20 percent with dominant slopes 5 to 15 percent. This unit is slightly dissected by streams, with dominant stream pattern being dendritic.

LTA components: This landtype association consists of mountain ridge tops.

Mountain ridge tops are formed in residuum. Slope gradients range from 0 to 20 percent, with dominant slopes 5 to 15 percent. Soils are shallow to moderately deep. Dominant soils include Typic Cryumbrepts and Typic Cryochrepts under tufted hairgrass series, subalpine forbs, alpine tundra and whitebark pine series. Rock outcrop occurs on 5 to 20 percent of this unit.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA77-M332En

FROST SHATTERED MOUNTAIN RIDGE TOPS: GNEISS

Location: This LTA is located throughout the Snowcrest, Gravelly, and Greenhorn mountains in southwest Montana. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

77-M332En 222

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in non-glaciated mountain slopes and is composed of mountain ridge tops. Parent materials are residuum derived from Precambrian gneiss, schists, phyllites, amphibolites, metasedimentary rocks and minor amounts of gabbro sills and marbles.

Accessory Characteristics: Dominant soils are shallow to moderately deep course sandy loams to loams with numerous rock fragments. The vegetation varies from subalpine meadows and conifers to alpine tundra. Mean annual precipitation ranges from 76 to 102 centimeters (30 to 40 inches). The elevation range is 2561 to 2866 meters (8400 to 9400 feet). The slope range is from 0 to 20 percent with dominant slopes of 5 to 15 percent. This unit is slightly dissected by streams, with dominant stream pattern being dendritic.

LTA components: This landtype association consists of mountain ridge tops.

Mountain ridge tops are formed in residuum. Slope gradients range from 0 to 20 percent, with dominant slopes of 5 to 15 percent. Soils are shallow to moderately deep. Dominant soils include Typic Cryumbrepts and Typic Cryochrepts under tufted hairgrass series, subalpine forbs, alpine tundra and whitebark pine series. Rock outcrop occurs on 5 to 20 percent of this unit.

Compiled by: Annie Greene, Beaverhead-Deerlodge National Forest

LTA77-M332E
LTA77-M331A

FROST SHATTERED MOUNTAIN RIDGE TOPS: GNEISSES AND SCHISTS

Location: This LTA is located the Tobacco Root and Madison Ranges in southwest Montana in the Jefferson and Madison Basins.

Acreage by Section

77-M332E	18,445	(Section except for M332En)
77-M331A	62,911	

LTA Setting and General Characteristics:

Differentiating Characteristics: This LTA occurs in a relatively high elevation gently to moderately sloping mountain landscape setting, at or above the zone of moderate and strong frost shattering. The unit is typically composed of frost shattered ridges and slopes, ranging from patterned ground to soil heaving. Parent materials are colluvium and residuum from Pre-Belt crystalline metamorphic rocks consisting of hornblende gneiss, quartzite, meta-diabase, sillimanite schist, quartz-feldspar gneiss, metamorphosed granite, and migmatite.

Accessory Characteristics: The primary soils are shallow to moderately deep, channery loams and sandy loams. The vegetation is a mosaic of alpine turf, talus, subalpine and montane coniferous forest, and mountain grasslands. Mean annual precipitation ranges from 41 to 91 centimeters (16 to 36 inches). The elevation range of this LTA is 2134 to 2743 meters (7000 to 9000 feet). The dominant slopes have gradients of 20 to 40 percent. This LTA is weakly dissected by streams, with the dominant stream pattern being dendritic. Wetlands, lakes, and ponds are a minor component of this LTA.

LTA Components: This landtype association consists of frost shattered ridges and slopes.

Frost shattered ridges and slopes are formed in colluvium and residuum derived from gneisses and schists. Slope gradients range from 15 to 40 percent. Soils on these landforms are moderately deep, well drained, weakly to moderately developed, channery sandy loams. These soils are classified as Lithic and Typic Cryoborolls, and Lithic and Typic Cryochrepts. Rock outcrop occurs on about 10 percent of this landscape component. The dominant potential natural vegetation is sedge, whitebark pine-subalpine fir, Douglas-fir, and subalpine fir series. This component represents 98 percent of this LTA.

Compiled by: Dan Svoboda, Beaverhead-Deerlodge National Forest

LTA81-M332E
LTA81-M332D

ROLLING HILLS: WEATHERED GRANITICS

Location: This LTA is located in the Boulder and Highland Mountains on the Beaverhead-Deerlodge National Forest in southwest Montana. It occurs in the upper Jefferson River and Clark Fork River Basins.

Acreage by Section:

81-M332E	36,161
81-M332D	95,357

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a mountain landscape setting, which is typically composed of rolling uplands. Parent materials are residuum and colluvium underlain by weathered granitic bedrock.

Accessory Characteristics: The primary soils are shallow to deep with gravelly sandy and loamy textures. The vegetation is coniferous forest and a mosaic of shrublands and grasslands and coniferous forest. Small areas of aspen are common. Mean annual precipitation ranges from 30 to 76 cms.(12 to 30 inches). The elevation range of this LTA is 1373 to 2591 meters (4500 to 8500 feet). The dominant slopes have gradients of 5 to 30 percent. This LTA is moderately or highly dissected by streams, with the dominant stream pattern being parallel and dendritic. Wetlands are a major component in this LTA.

LTA Components: This landtype association consists of two landform components: rolling uplands and alluvial flats.

Rolling uplands are formed in weathered quartz monzonite and similar coarse-grained igneous rocks of the Boulder Batholith. Slope gradients range from 0 to 40 percent. Soils on these landforms are shallow, moderately deep, to deep, are weakly to moderately developed, and have sandy loam, gravelly sandy loam and loamy sand surface soils. The subsurface layers are gravelly sandy loams, gravelly loamy sands and loamy sands in the less developed soils and gravelly sandy clay loams and sandy clay loams where subsoil clay accumulation occurs. Ustochrepts, Eutroboralfs and Haploborolls prevail at the lower elevations. Typic and Lithic Cryochrepts, Cryoboralfs and Cryoborolls dominate at the mid to high elevations. Rock outcrop occurs on 5 to 15 percent of this landscape component. Boulders are scattered on the surface on parts of the unit. The dominant potential natural vegetation is Idaho fescue, sagebrush, Douglas-fir, and subalpine fir series. This component represents 80 percent of this LTA.

Alluvial flats are formed in granitic alluvium and weathered granitic bedrock. Slope gradients range from 0 to 15 percent. Soils on these landforms are deep, weakly developed, with gravelly loamy textures. These soils are classified as Oxyaquic and Typic Cryochrepts and Cryoborolls. Rock outcrop does not occur on this landscape component. The dominant potential natural vegetation is willow, sedge, spruce, and subalpine fir series. This component represents 20 percent of this LTA.

Compiled by: Dave Ruppert, Beaverhead-Deerlodge National Forest.

LTA82-M332E
LTA82-M332D

ROLLING HILLS: VOLCANICS

Location: This LTA is located in the Boulder Mountains on the Beaverhead -Deerlodge Forest in southwest Montana. It occurs in the upper Clark Fork River basin.

Acreage by Section

82-M332E	6,817
82-M332D	13,249

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a mountain landscape setting, which is typically composed of rolling hills. Parent materials are residuum underlain by Tertiary and Cretaceous volcanic bedrock, including andesite, rhyolite, and welded and non-welded rhyolite and felsic tuffs.

Accessory Characteristics: The primary soils are shallow, moderately deep and deep loamy soils often with high cobble contents. The vegetation is coniferous forest or a mosaic of coniferous forest and shrubland/grassland. Mean annual precipitation ranges from 38 to 75 cms. (15 to 30 inches). The elevation range of this LTA is 1525 to 2135 meters (5000 to 7000 feet). The dominant slopes have gradients of 5 to 30 percent. This LTA is slightly to moderately dissected by streams with the dominant stream patterns being parallel. Wetlands are a minor component of this LTA.

LTA Components: This landtype association consists of one landform component: rolling hills.

Rolling hills are formed in colluvium and residuum over a variety of volcanic bedrock. Slope gradients range from 5 to 30 percent. Soils on these landforms are shallow, moderately deep and deep to bedrock. They are moderately and weakly developed with cobbly and very cobbly loam surface textures. The subsurface layers are cobbly and very cobbly loams and clay loams. These soils are classified as Typic and Lithic Cryochrepts and Cryoborolls, and Typic and Mollic Cryoboralfs. Rock outcrop occurs on about 10 percent of this landscape component. The dominant potential natural vegetation is Idaho fescue, sagebrush, Douglas-fir, and subalpine fir series. This component represents 100 percent of this LTA.

Compiled by: Dave Ruppert, Beaverhead-Deerlodge National Forest.

LTA83-M332En

LOW RELIEF HILLS: FINE TERTIARY SEDIMENTS

Location: This LTA is located throughout the Snowcrest and Gravelly mountain ranges and basins. These are drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

83-M332En	33,829

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in non-glaciated mountain slopes and is composed of gentle to moderate slopes. Parent material consists of poorly consolidated fluvial and lacustrine Tertiary sediments.

Accessory Characteristics: Dominant soils are deep to very deep, course to fine loams. Textures are variable depending on parent material source. Rock fragments are lacking. The vegetation varies from shrublands and grasslands to conifers. Mean annual precipitation is from 51 to 76 centimeters (20 to 30 inches). Elevation range is from 1951 to 2561 meters (6400 to 8400 feet). Slopes range from 5 to 50 percent with dominant slopes of 5 to 40 percent.

This unit is moderately to highly dissected by streams, with the dominant stream pattern being dendritic to subparallel.

LTA components: This landtype association consists of mountain slopes.

Mountain slopes formed in residuum and colluvium derived from poorly consolidated fluvial and lacustrine Tertiary sediments. Slopes range 5 to 50 percent, with dominant slopes of 5 to 40 percent. Dominant soils include Typic Cryoborolls and Argic Cryoborolls under mountain big sagebrush, Idaho fescue and Douglas-fir series. Under subalpine fir series there are Typic Cryochrepts.

Compiled by: Annie Greene, Beaverhead-DeerLodge National Forest

LTA83-M332E

LOW RELIEF HILLS: FINE TERTIARY SEDIMENTS

Location: This LTA is located on foothills in the basin southwest of Butte and in the Deer Lodge Valley on the Beaverhead-Deerlodge National Forest. It occurs in southwest Montana in the upper Jefferson and Clark Fork River Basins.

Acreage by Section

83-M332E	118,120	(Section except for M332En)

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a foothill landscape setting, which is typically composed of old terraces. Parent materials are residuum underlain by Tertiary sedimentary rocks.

Accessory Characteristics: The primary soils are moderately deep with loamy and clayey textures. The vegetation is a mosaic of shrublands and grasslands. Mean annual precipitation ranges from 41 to 46 centimeters (16 to 18 inches). The elevation range of this LTA is 1768 to 1829 meters (5800 to 6000 feet). The dominant slopes have gradients of 0 to 35 percent. This LTA is moderately dissected by streams, with the dominant stream pattern being parallel. Wetlands are a minor component of this LTA.

LTA Components: This landtype association consists of old terraces.

Old terraces are formed in Tertiary sedimentary rocks. Slope gradients range from 0 to 35 percent. Soils on these landforms are moderately deep, well developed, with loamy and clayey textures. These soils are classified as Typic Argiborolls. Rock outcrop generally is not found in this landscape component. The dominant potential natural vegetation is Idaho fescue, rough fescue, and sagebrush series. This component represents 100 percent of this LTA.

Compiled by: Dave Ruppert, Beaverhead-Deerlodge National Forest

LTA88-M332En

LOW RELIEF HILLS: COARSE TERTIARY SEDIMENTS

Location: This LTA is located throughout the Snowcrest mountains and basins in southwest Montana. This area is drained by the Ruby River in the Jefferson River Basin.

Acreage by Subsection

88-M332En 22,697

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in non-glaciated mountains composed of gentle to moderate slopes. Parent materials include Tertiary conglomerates, with quartzite matrix and limestone, sedimentary and undifferentiated clasts.

Accessory Characteristics: Dominant soils are deep to very deep coarse sandy loams with numerous rock fragments. Vegetation varies from shrublands and grasslands to conifers. Mean annual precipitation ranges from 51 to 102 centimeters (20 to 40 inches). Elevation ranges from 2992 to 4035 meters (7600 to 10200 feet). Slopes range from 20 to greater than 60 percent, with dominant slopes 20 to 50 percent. This unit is moderately to highly dissected by streams with the stream patterns being dendritic to subparallel.

LTA components: This landtype association consists of mountain slopes.

Mountain slopes formed in residuum and colluvium derived from Tertiary conglomerates. Dominant soils include Calcic Cryoborolls and Typic Cryoborolls under mountain big sagebrush and Idaho fescue series. Under Douglas-fir, subalpine fir and whitebark pine series Typic Cryochrepts are present. Rock outcrop occurs on 10 to 30 percent of this unit.

Compiled by: Annie Greene, Beaverhead-DeerLodge National Forest

LTA90-M332Ea

MASS WASTED SLOPES: MIXED GEOLOGY

Location: This LTA is located north of Electric Peak in the Little Blackfoot drainage of the Clark Fork basin.

Acreage by Subsection

90-M332Ea	4,492

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a mountainous landscape setting, which is typically composed of mountain slopes and ridges. Parent materials are old landslide deposits underlain by volcanic rock.

Accessory Characteristics: The primary soils are very deep and have clayey subsoils. The vegetation is coniferous forest. Mean annual precipitation ranges from 50 to 63 centimeters (20 to 25 inches). The elevation range of this LTA is 1799 to 2012 meters (5900 to 6600 feet). The dominant slopes have gradients of 10 to 40 percent. This LTA is moderately to highly dissected by streams, with the dominant stream pattern being deranged. Wetlands are a major component of this LTA.

LTA Components: This landtype association consists of landslides.

Landslides are formed in landslide deposits associated with volcanic bedrock. Slope gradients range from 10 to 40 percent. Soils on these landforms are very deep and well developed. They have moderately fine textured surface layers and high subsoil clay accumulations. They typically have silty clay loam surface textures. Subsoils are silty clay loam and silty clay with more than 35 percent rock (mostly gravel and cobble). These soils are classified as Mollic Cryoboralfs. Inclusions of Typic Cryaquolls are in bogs. The dominant potential natural vegetation is subalpine fir, spruce and Douglasfir.

Compiled by: Larry Laing, Helena National Forest

LTA90-M332Eb

MASS WASTED SLOPES: MIXED GEOLOGY

Location: This LTA is located near Fleecer Ridge on the Beaverhead-Deerlodge National Forest in southwest Montana in the upper Jefferson River Basin.

Acreage by Subsection/Subsection

90-M332Eb	3,901

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a mountain landscape setting and is composed of slumps and landflows. Parent materials are slump and landflow deposits underlain by siltstone and shale bedrock.

Accessory Characteristics: The primary soils are deep with loamy and clayey textures. The vegetation is a mosaic of mountain grasslands and coniferous forest. Mean annual precipitation ranges from 46 to 51 centimeters (18 to 20 inches). The elevation range of this LTA is 1829 to 2287 meters (6000 to 7500 feet). The dominant slopes have gradients of 10 to 35 percent. This LTA is moderately dissected by streams. The dominant stream pattern is parallel with local deranged areas. Wetlands are a major component of this LTA.

LTA Components: This landtype association consists of slumps and landflows.

Slumps and landflows are formed in siltstone and shale bedrock. Slope gradients range from 10 to 45 percent. Soils on these landforms are deep, moderately developed, with loamy and clayey textures. These soils are classified as Argic Cryoborolls and Typic Cryoboralfs. Rock outcrop occurs on about 5 percent of this landscape component. The dominant potential natural vegetation is Douglas-fir and subalpine fir series. This component represents 100 percent of this LTA.

Compiled by: Dave Ruppert, Beaverhead-Deerlodge National Forest

LTA90-M332En

MASS WASTED SLOPES: MIXED GEOLOGY

Location: This LTA is located throughout the Snowcrests and Gravelly mountains and basins in southwest Montana. This area is drained by the Ruby and Madison Rivers in the Jefferson River Basin.

Acreage by Subsection

90-M332En	73,061

LTA Setting and General Characteristics

Differentiating Characteristics: This map unit occurs in both glaciated and non-glaciated mountain areas. These units occur in soft sediments and also include collapsed glacial deposits in soft sediments. Landflows are characterized by undulating or steep micro-relief and indications of recent movement, such as slip scars, cracks or leaning trees. Landflows have many seeps, springs and depressions often containing small ponds or bogs. The drainage pattern is deranged, so runoff and groundwater collect in depressions.

Accessory Characteristics: Soils are deep to very deep coarse sandy loams to clays depending on parent material. Course fragments can be present. The vegetation is often mosaic with mixed grassland, shrubland and conifers. Aspens, sedges, wet forbs and grasses are associated with the depressional areas and high water tables. Mean annual precipitation ranges from 41 to 102 centimeters (16 to 40 inches). The elevation range is from 1951 to 2866 meters (6400 to 9400 feet). Slopes range from 5 to 50 percent, dominant slopes are 10 to 30 percent.

LTA Components: This landtype association consists of landflows.

Landflows (landslide deposits) formed in residuum of varying parent materials. On Cliff Lake bench, young Tertiary unconsolidated fluvial and lacustrine silts and sands are collapsing under recent volcanic flows. On the east side of the Ruby River, landslides are common in heavy clays from weathered shales. In the southwest area of the Snowcrests a conglomerate is weathering into coarse sands and collapsing with increased slope gradients. Other landslides are evident throughout the area. Dominant soils include Argic Pachic Cryoborolls under mountain big sage, Idaho fescue, tufted hairgrass and aspen series. Under Douglas-fir and subalpine fir series Typic Cryoboralfs are common. Minor amounts of Histic Cryaquolls and Histosols occur under sedge and willow series. Coarse fragments are common in the conglomerates and areas of collapsing glacial till.

Compiled by: Annie Greene, Beaverhead-DeerLodge National Forest

LTA90-M332E
LTA90-M331A

MASS WASTING: MIXED GEOLOGY

Location: This LTA is located in the Madison, Tobacco Root, Fleecer, Pioneer, Anaconda Pintlar, Beaverhead, Lima Peaks, and Tendoy Mountains. These are in southwest Montana in the Jefferson and Madison River Basins.

Acreage by Section/Subsection

90-M332E	25,903	(Section except for M332Ea, M332Eb, M332En)
90-M331Am	11,231	
90-M332Ap	55,734	

LTA Setting and General Characteristics:

Differentiating Characteristics: This LTA occurs in a foothills to mountain landscape setting which is typically composed of deep bedrock (hundreds of feet thick) and surficial (tens of feet thick) mass failures, both translational and rotational. Parent materials are landslide deposits, colluvium, and residuum derived mostly from Cretaceous and Tertiary shales and sandstones.

Accessory Characteristics: The primary soils are deep, silty clay loams, silty clays, and clays. The vegetation is a mosaic of subalpine coniferous forest, montane coniferous forest, and subalpine and mountain grasslands. Mean annual precipitation ranges from 36 to 102 centimeters (14 to 40 inches). The elevation range of this LTA is 2012 to 2804 meters (6600 to 9200 feet). The dominant slopes have gradients of 20 to 35 percent. This LTA is moderately dissected by streams, with the dominant stream pattern being deranged to dendritic. Wetlands and small ponds are a major component of this LTA.

LTA Components: This landtype association consists of scarp slopes and landslide deposits.

Scarp slopes are formed in colluvium, residuum, and sometimes old glacial deposits. Slope gradients range from 20 to 70 percent. Soils on these landforms are very shallow to shallow, weakly developed, channery and flaggy sandy loams, loamy fine sands, clay loams, and silty clays, and clays. These soils are classified as Typic Cryorthents and Typic Cryochrepts. Rock outcrop occurs on about 15 percent of this landscape component. The dominant potential natural vegetation is tufted hairgrass, and whitebark pine subalpine fir series; numerous early successional forb communities and primary succession. This component represents 10 percent of this LTA.

Landslide deposits and mountain slopes are formed in colluvium, residuum, old landslide deposits, and sometimes old glacial deposits (Bull Lake). Slope gradients range from 10 to 50 percent. Soils on these landforms are deep, moderately well developed, silty clay loams, silty clays and clays. These soils are classified as Aquic, Mollic, and Typic Cryoboralfs, Typic Argiborolls, and Argic Pachic Cryoborolls. Rock outcrop occurs on about 5 percent of this landscape component. The dominant potential vegetation is tufted hairgrass, whitebark pine-subalpine fir, spruce, subalpine fir, aspen, and Idaho Fescue series. This component represents 85 percent of this landscape component.

Compiled by: Dan Svoboda, Beaverhead-Deer Lodge National Forest

LTA92-M332E
LTA92-M332B
LTA92-M332D

COLLUVIAL DEPOSITS: MIXED GEOLOGY

Location: This LTA is located throughout the Helena National Forest.

Acreage by Section

92-M332E	3,557
92-M332B	6,383
92-M332D	12,928

LTA Setting and General Characteristics

Differentiating Characteristics: This LTA occurs in a mountainous landscape setting, which is typically composed of mountain slopes and ridges. Parent materials are colluvial deposits, in basins and on toeslopes, typically influenced by metasedimentary and volcanic rocks.

Accessory Characteristics: The primary soils are very deep and have loamy or clayey subsoils. The vegetation is coniferous forest. Mean annual precipitation ranges from 38 to 75 centimeters (15 to 30 inches). The elevation range of this LTA is 1464 to 2135 meters (4800 to 7000 feet). The dominant slopes have gradients of 10 to 50 percent. This LTA is highly dissected (but weakly incised) by streams, with the dominant stream pattern being parallel or subparallel. Wetlands are a major inclusion in this LTA.

LTA Components: This landtype association consists of colluvial deposits.

Colluvial deposits are derived from metasedimentary and volcanic rock. Some areas are also influenced by limestone colluvium. Slope gradients range from 10 to 50 percent. Soils on these landforms are very deep and weakly to well developed. They have moderately fine textured surface layers and high subsoil clay accumulations. They typically have very cobbly loam or cobbly silt loam surface textures. Subsoils are very cobbly loam, clay loam or silty clay loam. These soils are classified as Typic Cryochrepts, Typic Cryoboralfs, and Argic Cryoborolls. Inclusions of Aquic Cryoborolls, Aquic Cryoboralfs and Typic Cryaquepts are associated with seeps and springs. The dominant potential natural vegetation is subalpine fir, spruce and Douglasfir.

Compiled by: Larry Laing, Helena National Forest