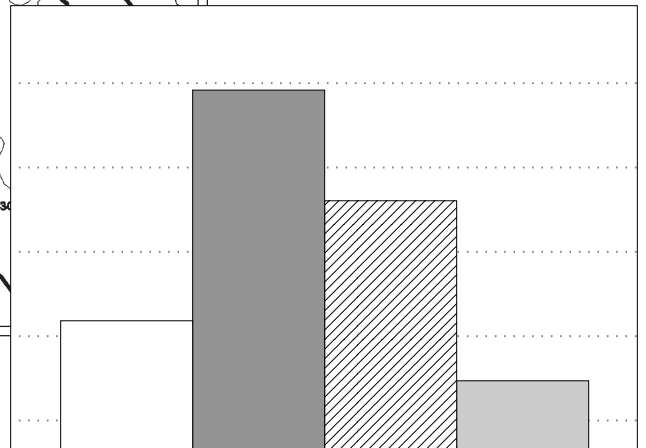
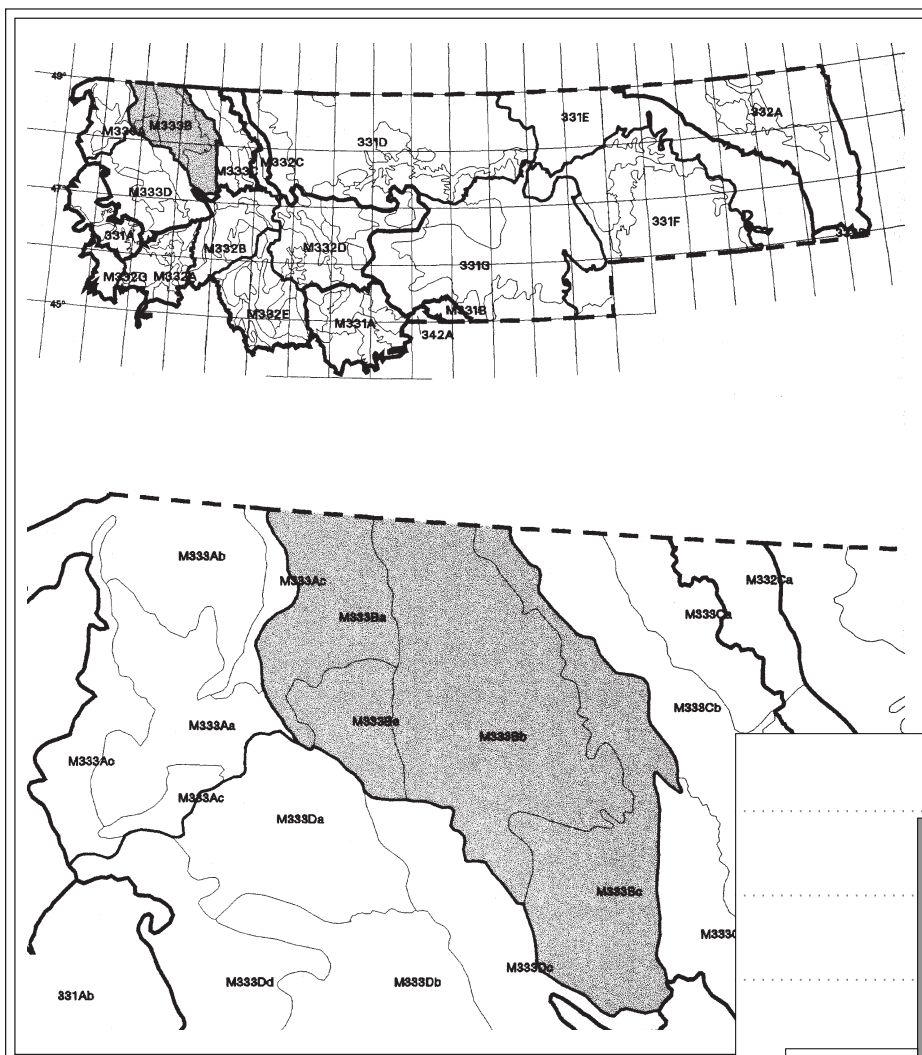




Ecological Units of the Northern Region: Subsections

John A. Nesser
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Ecological Units Of The Northern Region: Subsections

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Introduction

This subsection report is an effort to develop units that integrate information from various disciplines, single-purpose maps, and existing regionalizations. The development of ecological units and descriptive data is an iterative process that will continue as additional information becomes available. Peer review and comments by users of this information are important to this process. All ecological mapping and descriptions follow the Forest Service's National Hierarchical Framework of Ecological Units (ECOMAP 1993).

Development of the Map and Descriptions

Subsections are smaller areas of sections with similar surficial geology, lithology, geomorphic process, soil groups, subregional climate, and potential natural communities (ECOMAP 1993). Each subsection has landscape components that differentiate it from adjacent subsections. The differentia used to place lines on the map include geologic materials, geomorphic features, and climate. Other components describe each subsection but are not used to delineate the units; these are called accessory characteristics and include soils and vegetation.

Geologic materials affect ecosystem processes. The physical and chemical properties of bedrock and surficial materials influence such processes as weathering, soil formation, vegetation distribution, and stream chemistry. Landscape features such as elevation, aspect, and slope influence the distribution of solar radiation and precipitation. This affects vegetation patterns, soil formation, hydrologic processes, and animal populations.

The U.S. Geological Survey 1:500,000 Albers Conic Equal-Area Maps for Montana, Idaho, and North Dakota were used for the base maps. Geologic materials were determined from 1:500,000 State geology maps with some minor refinements based on additional geologic maps and local knowledge. Geomorphic features were determined using 1:500,000 State topographic and shaded relief maps and local knowledge. Broad climatic zones were inferred from potential natural vegetation mapping using Kuchler (1964), regional vegetation information, and isohyetal maps.

The Forest Service's National Hierarchical Framework of Ecological Units (ECOMAP 1993) numbering/lettering system was applied to all subsections. For example, in this publication, a capitalized letter following the number indicates a section; the lowercase letter that follows indicates a subsection.

Uses of the Map and Descriptions

Subsection maps and descriptions are used at the subregion scale for strategic, multiregion, Statewide, and multiagency analysis and assessment (ECOMAP 1993). Use of this or any map should be consistent with the scale and methods used to compile it. The subsection map was designed for broad-scale ecosystem analysis and should not be used for detailed work. The map was produced at 1:500,000 and is intended to be used at that or a smaller scale. Plotting and using the subsection map at scales larger than 1:500,000 (1:24,000 for example) constitutes a misuse of the map and should not be done.

Due to the great amount of variability within the subsections, interpretations for parameters such as erosion were not made. Interpretations at this level must necessarily be based on many assumptions, generalizations, and averages. Such ratings or interpretations generally lack any real value.

Landscape and Climate Overview of the Northern Region _____

The following overview is intended to give the reader a general understanding of the landscapes and climate of the Northern Region. The overview is arranged by section or groups of similar sections.

331A Palouse Prairie—This section has a maritime-influenced warm temperate climate with hot, dry summers and cool, moist winters. Columbia River Basalts formed much of the landscape of low relief plateaus and rolling hills dotted with steptoes. Major streams are deeply entrenched into the uplifted highlands forming large canyons. This section covers 3,243,257 acres.

331D Northwestern Glaciated Plains and 331E Northern Glaciated Plains—These sections have a cold continental climate with warm, dry summers and cold, dry winters. Large expanses of prairie with scattered highlands characterize these sections. Glacial drift up to 100 feet thick covers the landscape and glacial knob and kettle topography is typical. Ice damming of major rivers also created areas of lacustrine and delta sediments. These sections cover 40,078,875 acres.

331F Northwestern Great Plains, 331G Powder River Basin, and 342A Bighorn Basin—These sections all have cold continental climates with warm to hot, dry summers and cold, dry winters. These nonglaciated plains are typically gently rolling low relief grasslands. Bedrock is Cretaceous marine shale, Tertiary fluvial sediments, and some large sandstone units. Clinker beds or “scoria” from burnt coal seams form colorful resistant beds in Tertiary outcrops. These sections cover 41,524,948 acres.

332A Northeastern Glaciated Plains and 332B Western Glaciated Plains—These sections both have a cold continental climate with warm to hot, humid summers and cold, moist winters. The topography is a rolling, glaciated drift prairie with numerous potholes and moraines. Thick glacial drift covers most of the landscape though lacustrine sediments also occur as a result of glacial ice damming. These sections cover 16,592,171 acres.

M331A Yellowstone Highlands, M331B Bighorn Mountains, M332C Rocky Mountain Front, M332D Belt Mountains, and M332E Beaverhead Mountains—These sections all have cold continental climates with warm, dry summers and cold, dry winters. The topography is dominantly uplifted and faulted mountains and high plateaus with a variety of bedrock. Higher elevations are typically shaped by mountain glaciation and exhibit typical cirqueland features. Steep dipslopes, flatirons, and hogbacks are typical of the Rocky Mountain Front and parts of Bighorn Mountains. Large gravel filled valleys are typical in the Beaverhead Mountains section of southwestern Montana. In central Montana, the mountains occur as widely separated uplifts surrounded and isolated by prairie. These sections cover 23,835,539 acres.

M332A Idaho Batholith—This section has a maritime influenced cool temperate climate with warm, dry summers and cool, moist winters. The batholith is a large, contiguous uplifted area of granitics characterized by large, rounded mountain masses and basin areas. Soils formed in gruss, loess, and volcanic ash. The landscape is deeply cut by the Idaho canyonlands. Mountain glaciation occurred at higher elevations. This section covers 3,883,095 acres.

M332B Bitterroot Valley and M333D Bitterroot Mountains—These sections have maritime influenced cool temperate climates with warm, dry summers and cool, moist winters. Belt rocks (quartzite and argillite) are resistant to weathering and form typical landscapes of steep slopes and incised V-shaped valleys. Talus and rock outcrops are common. The Bitterroot Valley is a large intermontane valley formed in valley fill materials. The higher elevations are typically large U-shaped valleys with abundant rock outcrop, cirques, horns, and other glacial features. Till, outwash, and moraines fill the valley floors. These sections cover 9,136,505 acres.

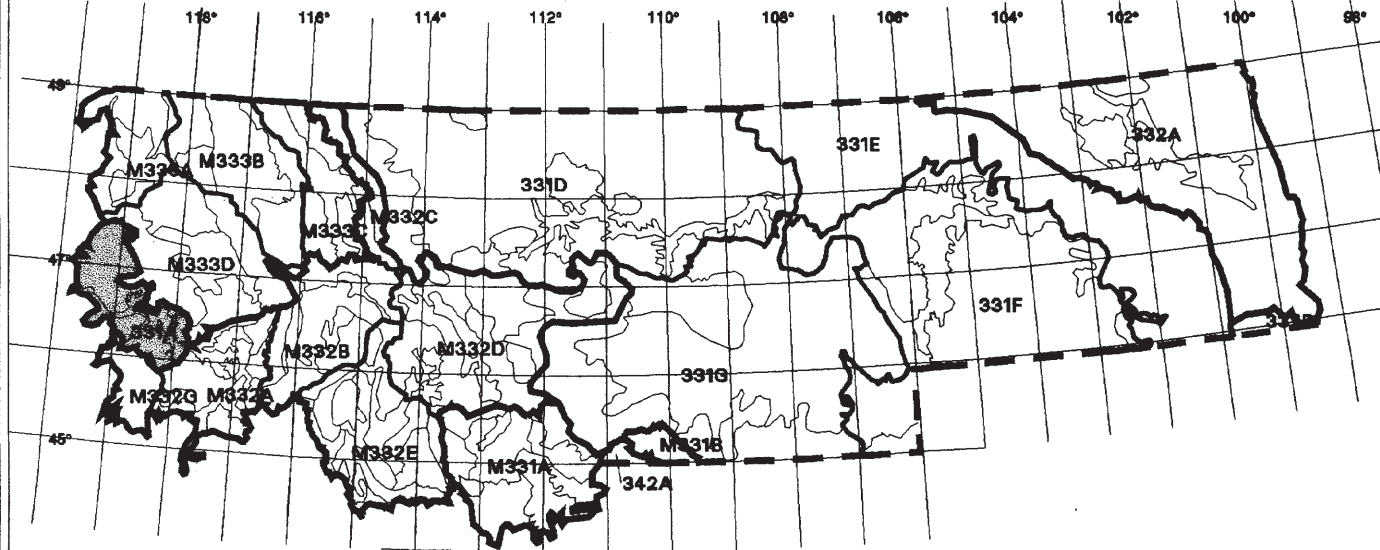
M332G Blue Mountains—This section has a maritime influenced cool temperate climate with warm, dry summers and cool, moist winters. The landscape is dominated by deeply entrenched major streams. Steep, high relief breaks and narrow valleys are characteristic. Columbia River Basalts and related plateau landscapes also occur in this section. This section covers 1,345,904 acres.

M333A Okanogan Highlands, M333B Flathead Valley, and M333C Northern Rockies—These sections have maritime influenced cool temperate climates with warm, dry summers and cool, moist winters. The landscape is dominated by rounded landforms that resulted from continental glaciation. Till deposits, often 50 to 100 feet thick, cover the mountainsides and valley floors. A mantle of loess and volcanic ash occurs over most of the glacial deposits. Some metasedimentary Belt rock landscapes remain. The Northern Rockies section is dominantly metasedimentary mountains that have been characteristically shaped by alpine glaciation. These sections cover 11,908,199 acres.

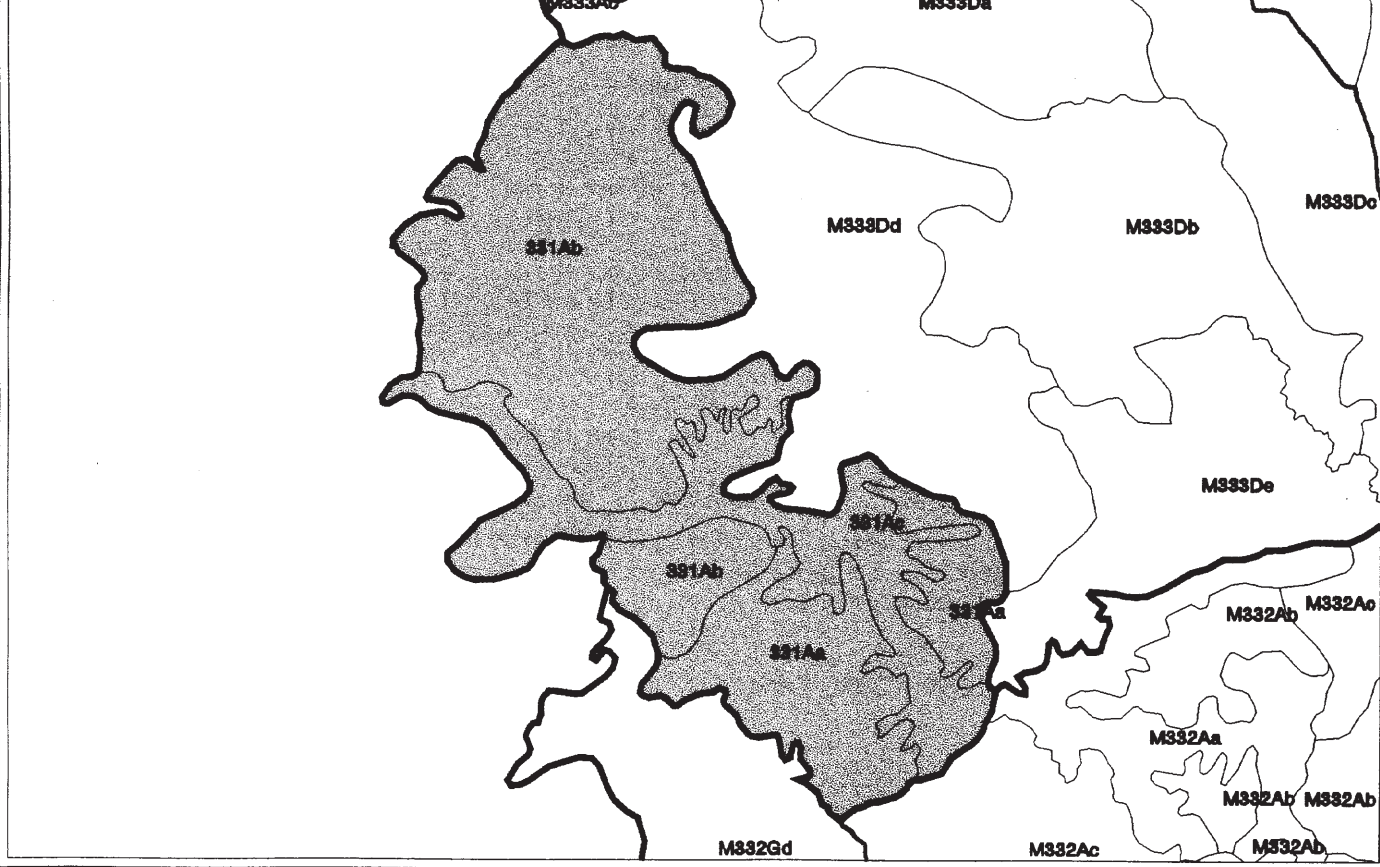
Subsection Descriptions, Arranged by Section _____

While the previous material was arranged by section or groups of similar sections, the remainder of the book (before the appendices) is arranged by numerical order of the subsections themselves. Maps show the placement of the section within the Northern Region, and a close-up detail of the placement of subsections within each section.

Section 331A PALOUSE PRAIRIE

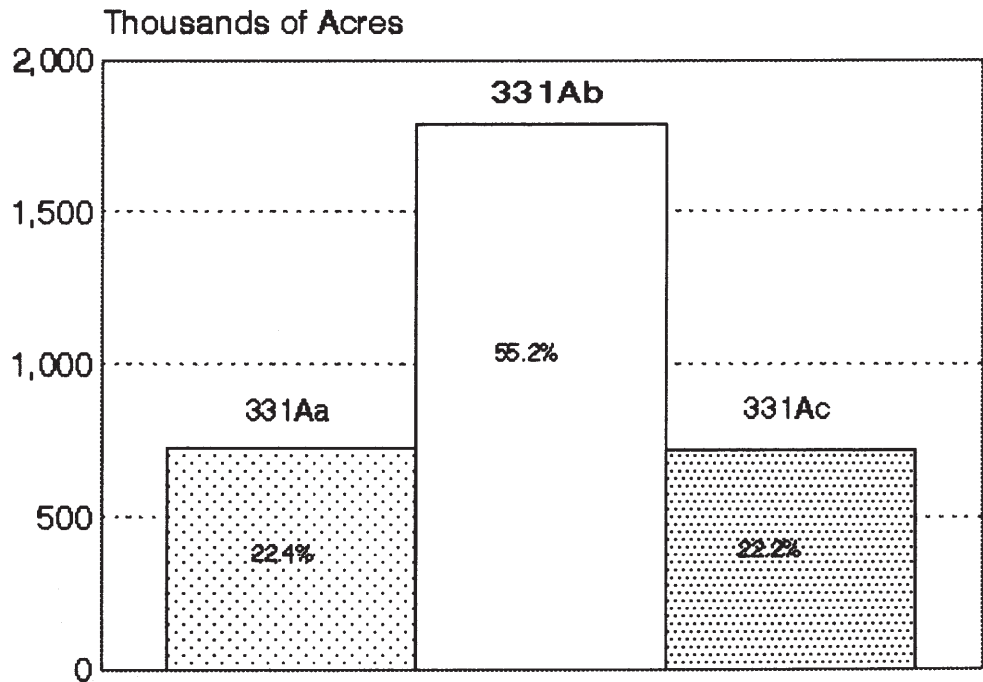


Subsections of Section 331A



Section 331A: Palouse Prairie

Subsection Acreages



331Aa Camas/Weippe Basalt Plateaus

Landscape Characteristics: Weakly dissected basalt plateaus that are overlain by extensive areas of loess and volcanic ash. Elevations range from 800 to 4,500 feet. Drainage density is moderate and wetlands are fairly common.

Climate: Mean annual precipitation ranges from 15 to 45 inches, about 40 to 50 percent falling as snow. The soil temperature and moisture regimes are frigid and typic xeric.

Potential Vegetation: Fescue-wheatgrass with Western ponderosa forest at higher elevations and on north aspects.

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plateaus	Loess underlain by basalt	Argixerolls/Argialbolls/ Udivitriands/Fragiborolls

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly hayland, grazing, and timber harvest.

331Ab Palouse Hills

Landscape Characteristics: Hills covered with deep loess underlain by basalt. Elevations range from 1,000 to 5,000 feet. Drainage density is low.

Climate: Mean annual precipitation ranges from 10 to 25 inches, most falling as snow in the winter. The soil temperature and moisture regimes are frigid and typic xeric.

Potential Vegetation: Wheatgrass-bluegrass

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Hills	Loess over basalt	Haploxerolls/Argixerolls/ Xerochrepts

Disturbance and Land Use: The primary natural disturbance is wind and fire. Land use is predominantly dryland farming and grazing.

331Ac Clearwater Canyon Breaks

Landscape Characteristics: Stream breaks and steep mountain slopes formed in basalt. Erosion and mass wasting are the dominant geomorphic processes. Elevations range from 900 to 3,000 feet. Drainage density is high.

Climate: Mean annual precipitation ranges from 15 to 25 inches, with only a minor amount falling as snow. The soil temperature and moisture regimes are frigid and typic xeric.

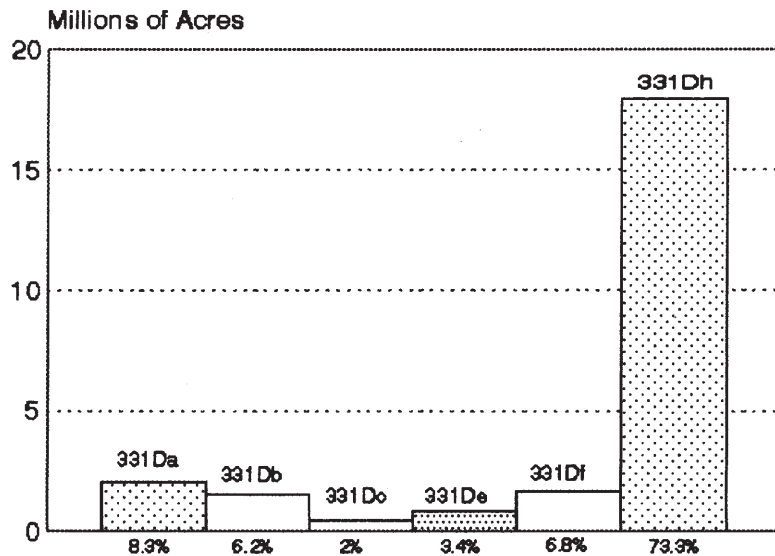
Potential Vegetation: Wheatgrass-bluegrass with Western ponderosa forest on low terraces or north aspects.

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Breaks	Basalt	Argixerolls
Canyon floors	Alluvium/loess	Argixerolls/Haploxerolls/ Xerofluvents

Disturbance and Land Use: The primary natural disturbance is fire and mass wasting. Land use is predominantly livestock grazing.

Section 331D: Northwestern Glaciated Plains Subsection Acreages



331Da Rocky Mountain Front Foothills

Landscape Characteristics: Mountain front foothills, moraines, fans, and terraces that formed in calcareous shales overlain by till, outwash, alluvium, and terrace deposits. The landscape has been modified by glaciation. Elevations range from 3,400 to 6,000 feet. Drainage density is low to moderate.

Climate: Mean annual precipitation ranges from 12 to 20 inches, about half falling as snow. The soil temperature and moisture regimes are frigid and typic ustic. Chinook winds are frequent.

Potential Vegetation: Wheatgrass-fescue-needlegrass

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Foothills/moraines	Till	Haploborolls/ Ustorthents
Fans/terraces	Calcareous outwash	Argiborolls/Calciborolls

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly livestock grazing.

331Db Montana Isolated Mountain Ranges

Landscape Characteristics: Mountainsides, foothills, terraces, moraines, and fans that formed in Tertiary volcanics and mixed sedimentary rocks. Continental glaciation influenced these mountain ranges. Elevations range from 2,500 to 5,500 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 16 to 30 inches, about 70 percent falling as snow. The soil temperature and moisture regimes are frigid (cryic at higher elevations) and typic ustic. Chinook winds are common.

Potential Vegetation: Douglas-fir forest at higher elevations with foothills prairie on foothill and lower elevations.

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/moraines	Till/volcanics/ mixed sedimentary	Cryoborolls/Cryoboralfs/ Cryochrepts
Foothills	Volcanics/sedimentary	Haploborolls/Paleboralfs
Terraces/fans	Mixed sedimentary	Argiborolls/Haploborolls

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly livestock grazing and some timber harvest.

331Dc Belt Mountain Foothills

Landscape Characteristics: Dissected foothills, plains, fans, and terraces that formed in alluvium and calcareous materials from shale and siltstone. Elevations range from 3,500 to 5,500 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 15 to 19 inches, about 50 percent falling as snow. The soil temperature and moisture regimes are frigid and typic ustic. Chinook winds are common.

Potential Vegetation: Foothills prairie

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Foothills	Shale/siltstone	Haploborolls/Paleboralfs/ Torriorthents
Plains/terraces/fans	Calcareous sediments/ alluvium	Calciborolls/Haploborolls

Disturbance and Land Use: The primary natural disturbance is fire and wind. Land use is mostly livestock grazing with some cropland.

331De Little Belt Foothills

Landscape Characteristics: Foothills, terraces, and fans that formed in shale, siltstone, and terrace deposits. Elevations range from 3,500 to 5,000 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 15 to 19 inches, about 40 to 50 percent falling as snow. The soil temperature and moisture regimes are frigid and typic ustic.

Potential Vegetation: Foothills prairie/Grama-needlegrass-wheatgrass

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Foothills	Shale/siltstone	Haploborolls/Calciborolls/ Argiborolls
Terraces/fans	Terrace deposits/ alluvium	Argiborolls/Calciborolls

Disturbance and Land Use: The primary natural disturbance is drought. Land use is predominantly livestock grazing.

331Df Missouri River Breaks

Landscape Characteristics: Steep, dissected river breaks formed in clay shale, sandstone, and siltstone. Erosion is the dominant geomorphic process. Elevations range from 1,800 to 4,400 feet. Drainage density is high. Fort Peck Reservoir occurs here.

Climate: Mean annual precipitation ranges from 10 to 15 inches, about 20 to 30 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic.

Potential Vegetation: Eastern ponderosa forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
River breaks	Sedimentary	Torriorthents

Disturbance and Land Use: The primary natural disturbance is erosion. Land use is predominantly livestock grazing and wildlife habitat.

331Dh Montana Glaciated Plains

Landscape Characteristics: Plains, terraces, fans, and floodplains that formed in glacial till, gravel deposits, and alluvium over clay shale, sandstone, and siltstone. Elevations range from 1,800 to 4,400 feet. Drainage density is moderate and glacial potholes are common, especially in the northern part of subsection.

Climate: Mean annual precipitation ranges from 10 to 15 inches, about 20 to 30 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic.

Potential Vegetation: Grama-needlegrass-wheatgrass

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plains	Till/shale	Argiborolls/Paleargids/ Ustorthents/Torriorthents
Terraces/fans/ floodplains	Gravel deposits/ alluvium	Torrifluvents/Ustifluvents/ Ustochrepts

Disturbance and Land Use: The primary natural disturbance is drought. Land use is predominantly livestock grazing with some dryland farming.

331Ea Missouri Coteau

Landscape Characteristics: Hummocky plains, outwash and stream terraces, fans, and floodplains that formed in thin glacial till and river sediments that lie over shale, siltstone, and sandstone. Moraines, kames, kettles, and small lakes also occur. Elevations range from 1,650 to 3,050 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 10 to 17 inches, about 20 percent falling as snow. The soil temperature and moisture regimes are frigid and udic.

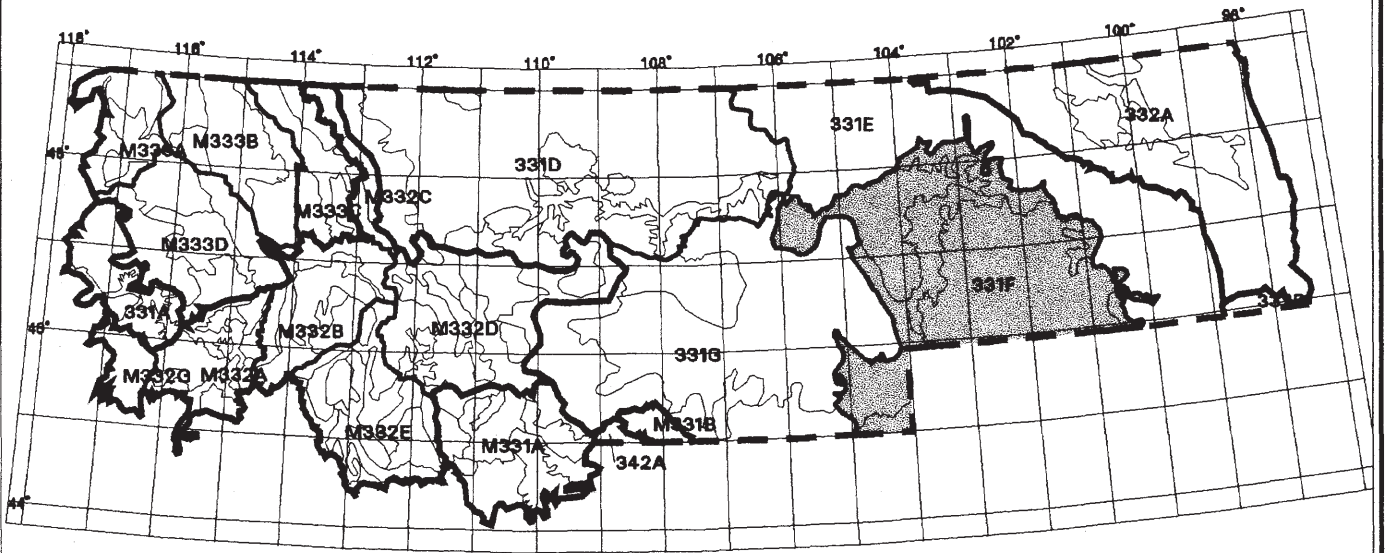
Potential Vegetation: Wheatgrass-needlegrass with Northern floodplain forest along major rivers and streams.

Relationships of Dominant Map Unit Components:

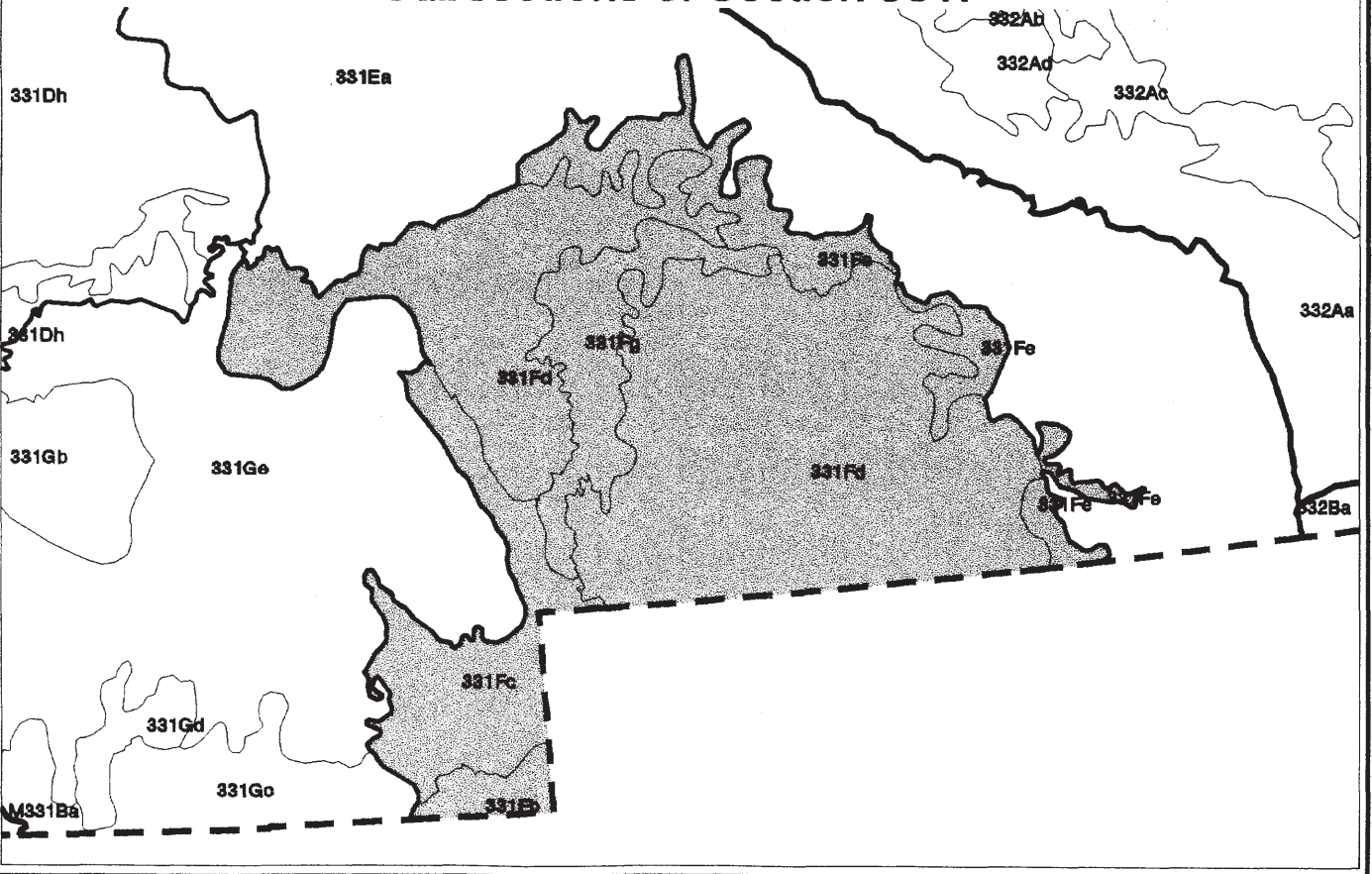
<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plains	Till	Argiborolls/Haploborolls
Terraces/fans	Outwash	Haploborolls/Natriborolls
Floodplains	River sediments	Orthents/Fluvents

Disturbance and Land Use: The primary natural disturbance is drought and insects. Land use is predominantly wheat farming and range/pasture.

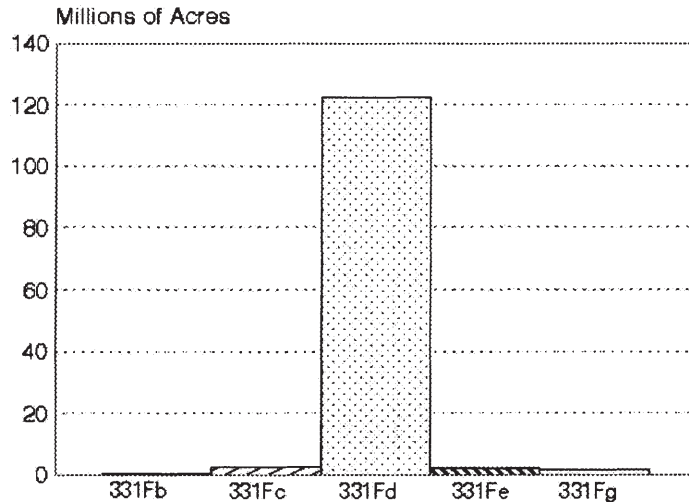
Section 331F NORTHWESTERN GREAT PLAINS



Subsections of Section 331F



Section 331F: Northwestern Great Plains Subsection Acreages



331Fb Shale Scablands

Landscape Characteristics: Dissected shale plains formed in calcareous shale, claystone, and sandstone. Elevations range from 2,650 to 4,100 feet. Drainage density is high.

Climate: Mean annual precipitation ranges from 11 to 15 inches, about 20 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic.

Potential Vegetation: Wheatgrass-needlegrass

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Dissected plains	Calcareous sedimentary	Torriorthents/Camborthids/Natrargids

Disturbance and Land Use: The primary natural disturbance is drought. Land use is predominantly livestock grazing.

331Fc Pierre Shale Plains

Landscape Characteristics: Rolling plains and low hills, floodplains, fans, and terraces that formed in alluvium and colluvium weathered from shale and sandstone. Badlands and river breaks occur along the lower Yellowstone and Powder Rivers. Elevations range from 1,000 to 3,500 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 10 to 14 inches, about 20 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic. Summers are usually dry.

Potential Vegetation: Wheatgrass-needlegrass and Grama-needlegrass-wheatgrass

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plains/hills	Shale/sandstone	Torriorthents/Ustorthents/ Camborthids/Ustochrepts
Terraces	Alluvium	Haplargids/Haploborolls/ Torrifluents/Camborthids
Fans/floodplains	Alluvium	Camborthids/Torrifluents
River breaks	Alluvium/colluvium	Torriorthents

Disturbance and Land Use: The primary natural disturbance is drought and wind. Land use is predominantly livestock grazing with some dryland farming.

331Fd Missouri Plateau

Landscape Characteristics: Plains, fans, and terraces that formed in alluvium and residuum from shale, siltstone, and sandstone. Elevations range from 1,000 to 3,500 feet. Drainage density is low to moderate.

Climate: Mean annual precipitation ranges from 10 to 14 inches, about 20 percent falling as snow. The soil temperature and moisture regimes are frigid and typic ustic. Summers are usually dry.

Potential Vegetation: Wheatgrass-needlegrass

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plains/terraces	Sedimentary	Haploborolls/Argiborolls/ Ustorthents/Ustochrepts
Fans/floodplains	Alluvium	Ustochrepts/Ustifluents

Disturbance and Land Use: The primary natural disturbance is drought. Land use is predominantly livestock grazing and dryland farming.



Figure 1—331Fd - Missouri Plateau. Squaretop Butte and Dissected Plains.

331Fe Missouri Breaks

Landscape Characteristics: Hilly plains, river breaks, terraces, and floodplains that formed in alluvium, sedimentary rocks, and some glacial till. Elevations range from 1,700 to 2,000 feet. Drainage density is high.

Climate: Mean annual precipitation ranges from 10 to 14 inches, about 20 percent falling as snow. The soil temperature and moisture regimes are frigid and typic ustic.

Potential Vegetation: Wheatgrass-needlegrass and Northern floodplain forest.

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plains	Sedimentary	Ustochrepts/Ustorthents/ Haploborolls
Breaks/terraces	Alluvium/till	Ustochrepts/Argiborolls/ Ustorthents
Floodplains	Alluvium	Ustifluvents

Disturbance and Land Use: The primary natural disturbance is erosion. Land use is predominantly grazing and recreation.

331Fg Little Missouri Badlands

Landscape Characteristics: Badlands and river breaks that formed in shale. Erosion is the major geomorphic process. Elevations range from 1,950 to 3,300 feet. Drainage density is high.

Climate: Mean annual precipitation ranges from 14 to 16 inches, about 40 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic. The Killdeer Mountains also occur here.

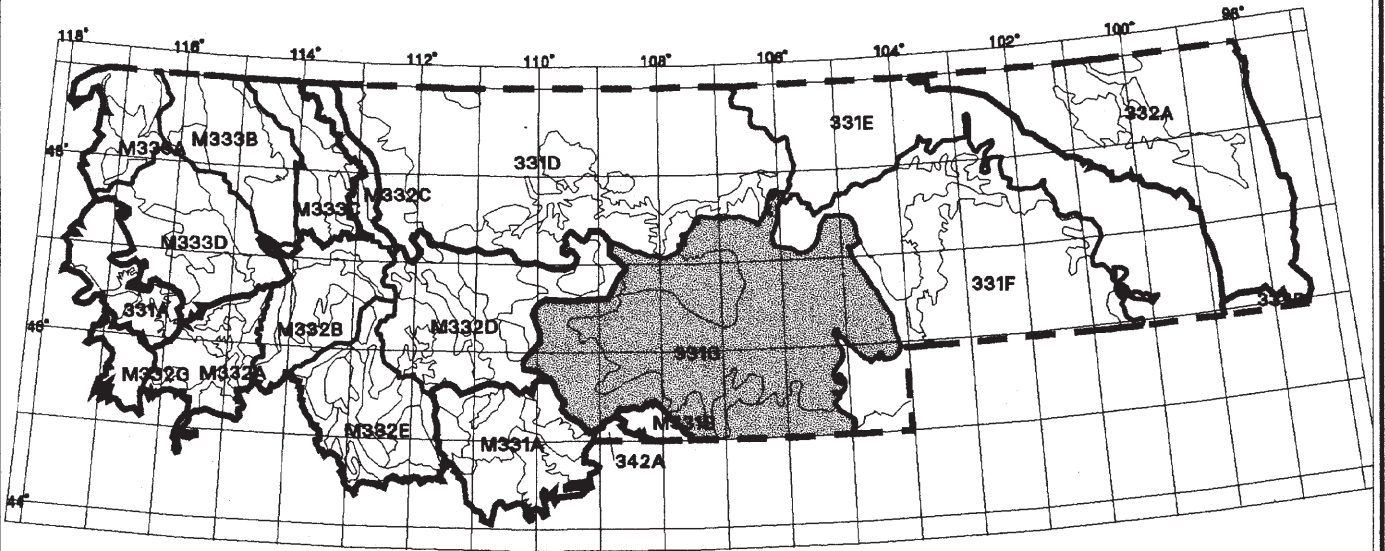
Potential Vegetation: Wheatgrass-needlegrass with Northern floodplain forest and some Eastern ponderosa forest along drainageways.

Relationships of Dominant Map Unit Components:

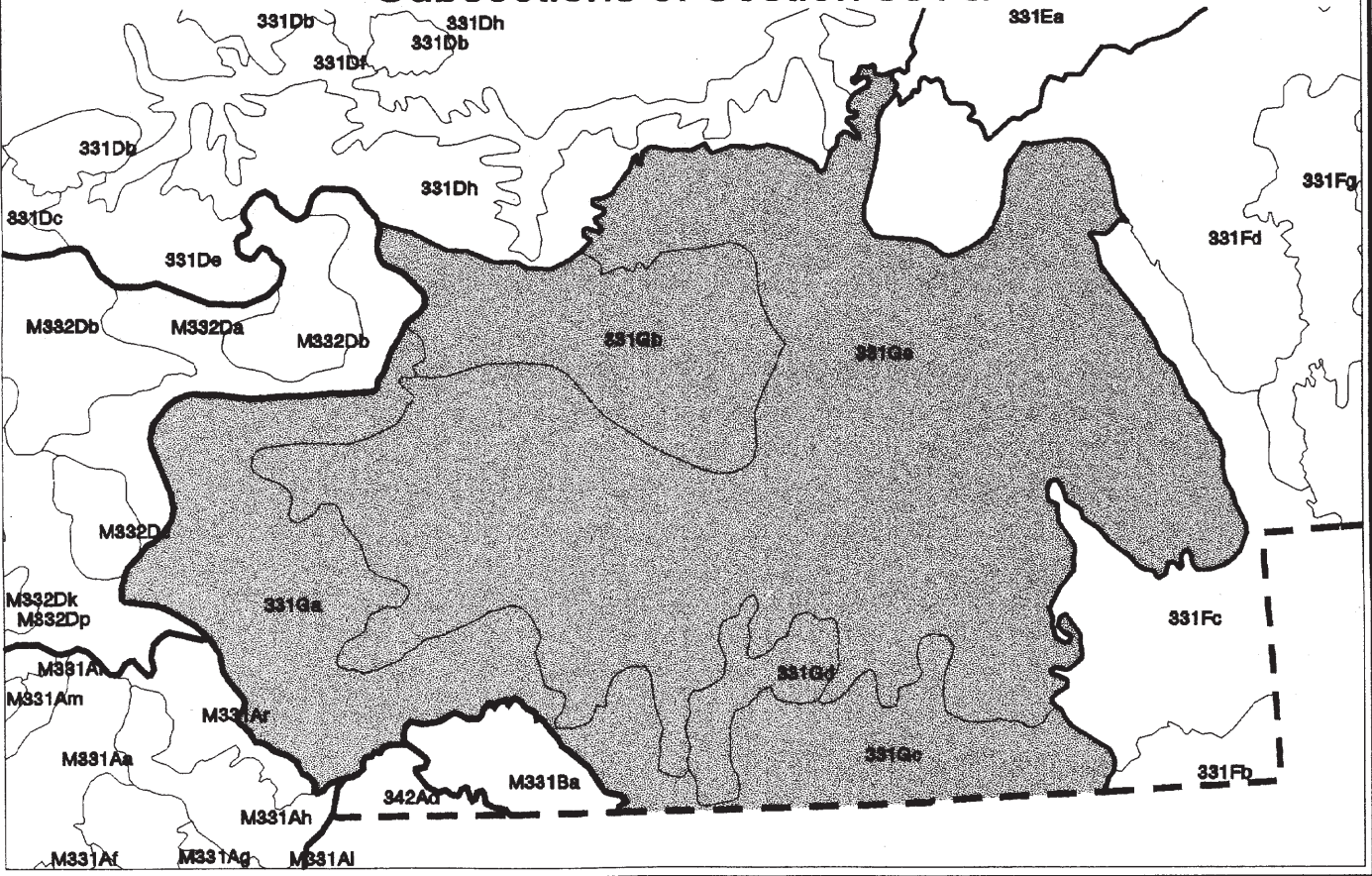
<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Badlands/breaks	Shale	Torriorthents/rock outcrop

Disturbance and Land Use: The primary natural disturbance is erosion. Land use is predominantly livestock grazing.

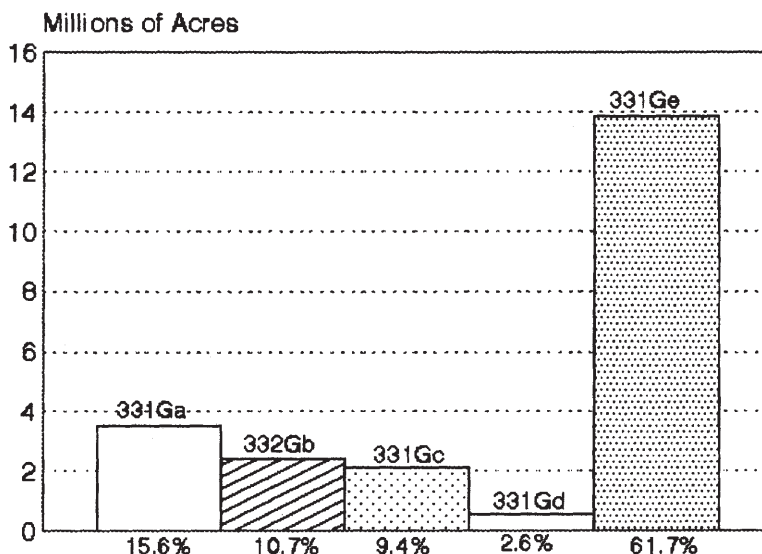
Section 331G POWDER RIVER BASIN



Subsections of Section 331G



Section 331G: Powder River Basin Subsection Acreages



331Ga Montana High Plains and Foothills

Landscape Characteristics: Dominantly plains and foothills with some terraces and fans that formed in sandstone and shale. Elevations range from 2,900 to 6,000 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 12 to 20 inches, about 35 percent falling as snow. The soil temperature and moisture regimes are frigid and tyic ustic/aridic ustic. Chinook winds are frequent.

Potential Vegetation: Grama-needlegrass-wheatgrass and Foothills prairie. Some Eastern ponderosa forest also occurs at higher elevations.

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plains/foothills	Sandstone/shale	Ustorthents/Haploborolls/ Argiborolls/Haplargids
Terraces/fans	Alluvium	Calciorthids/Argiborolls

Disturbance and Land Use: The primary natural disturbance is drought. Land use is predominantly livestock grazing with some dryland farming.

331Gb Montana Shale Plains

Landscape Characteristics: Dissected plains, hills, terraces, fans, and floodplains that formed in shale, siltstone, and sandstone. Elevations range from 1,500 to 3,500 feet. Drainage density is moderate to high.

Climate: Mean annual precipitation ranges from 10 to 14 inches, about 30 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic. Summers are dry.

Potential Vegetation: Grama-needlegrass-wheatgrass

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plains/hills	Sedimentary	Torriorthents/Camborthids/ Ustochrepts/Argiborolls
Terraces/fans/ floodplains	Alluvium	Camborthids/Natrargids/ Argiborolls/Torrifluvents

Disturbance and Land Use: The primary natural disturbance is drought and erosion. Land use is predominantly livestock grazing with some dryland farming.

331Gc Powder River Basin/Breaks/Scoria Hills

Landscape Characteristics: Dissected plains and hills, terraces, and fans with some river breaks and badlands that formed in alluvium and colluvium from sandstone, shale, and siltstone. Elevations range from 2,100 to 4,980 feet. Drainage density is moderate to high.

Climate: Mean annual precipitation ranges from 10 to 14 inches, about 20 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic. Summers are dry.

Potential Vegetation: Grama-needlegrass-wheatgrass with some Eastern ponderosa forest along river breaks and higher elevations.

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plains/hills	Sedimentary	Ustorthents/Argiborolls/ Torriorthents/Camborthids
Terraces/fans	Alluvium	Haplargids/Haploborolls/ Torrifluvents
Breaks/badlands	Alluvium/colluvium	Torriorthents

Disturbance and Land Use: The primary natural disturbance is drought and erosion. Land use is predominantly livestock grazing.

331Gd Wolf Mountains

Landscape Characteristics: Strongly rolling hills and plains that formed in shale and sandstone. Elevations range from 3,500 to 5,000 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 15 to 19 inches, about 40 percent falling as snow. The soil temperature and moisture regimes are frigid and typic ustic. Summers are dry.

Potential Vegetation: Eastern ponderosa forest and Foothills prairie

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Hills/plains	Sedimentary	Ustochrepts/Ustorthents/ Haploborolls

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly livestock grazing. A small amount of timber is harvested.

331Ge Montana Sedimentary Plains

Landscape Characteristics: Plains and hills formed in residuum and alluvium from shale and sandstone. Some lacustrine sediments also occur. Elevations range from 2,100 to 4,150 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 10 to 14 inches, about 30 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic. Summers are dry.

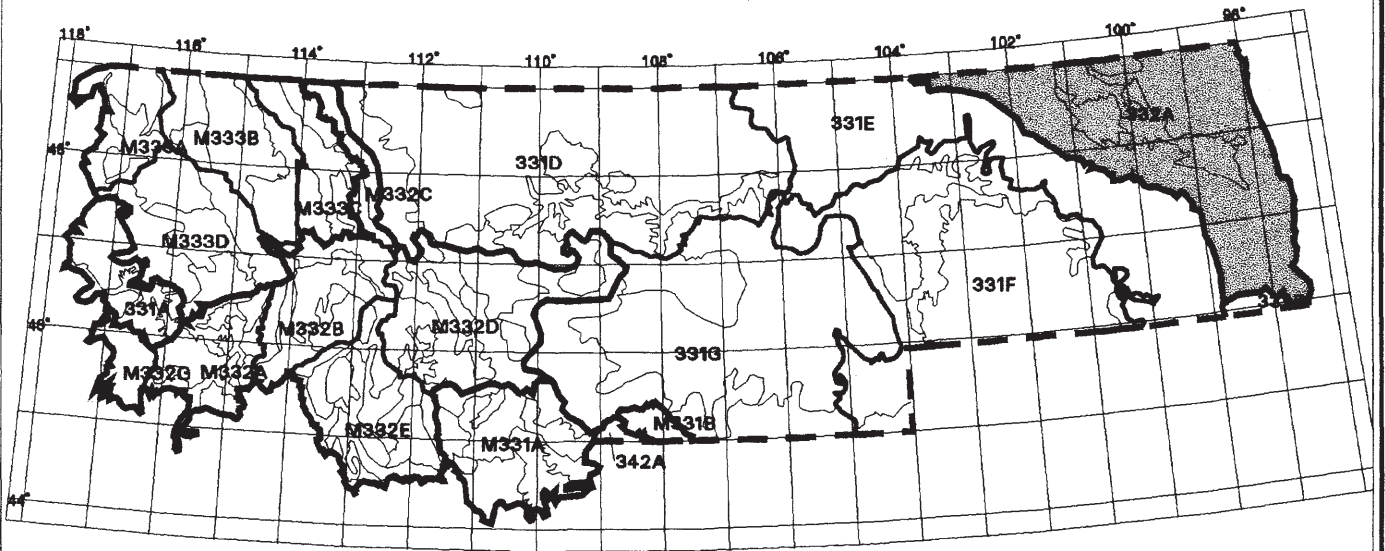
Potential Vegetation: Grama-needlegrass-wheatgrass with Eastern ponderosa forest on higher elevation hills.

Relationships of Dominant Map Unit Components:

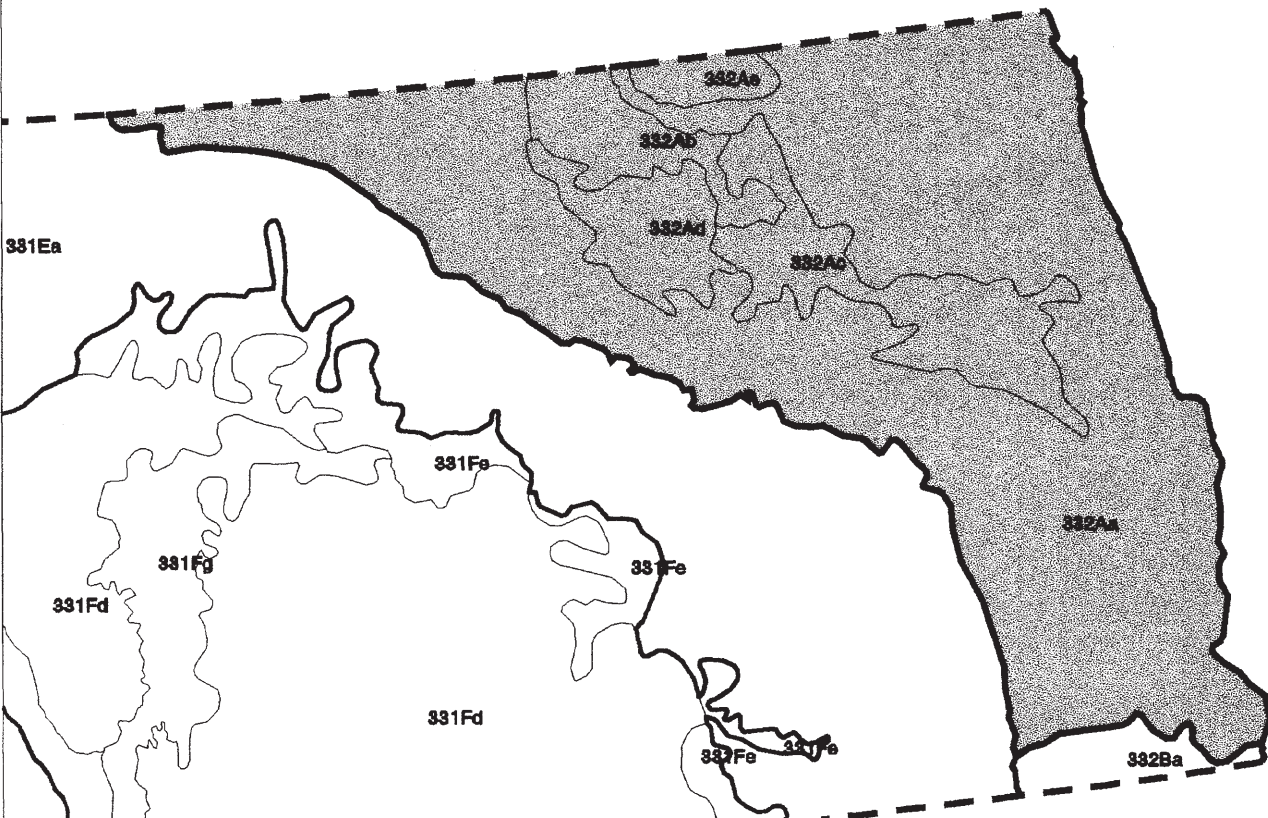
<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plains/hills	Sedimentary	Camborthids/Haplargids/ Haploborolls/Ustochrepts

Disturbance and Land Use: The primary natural disturbance is fire and drought. Land use is predominantly livestock grazing with a small amount of dryland farming.

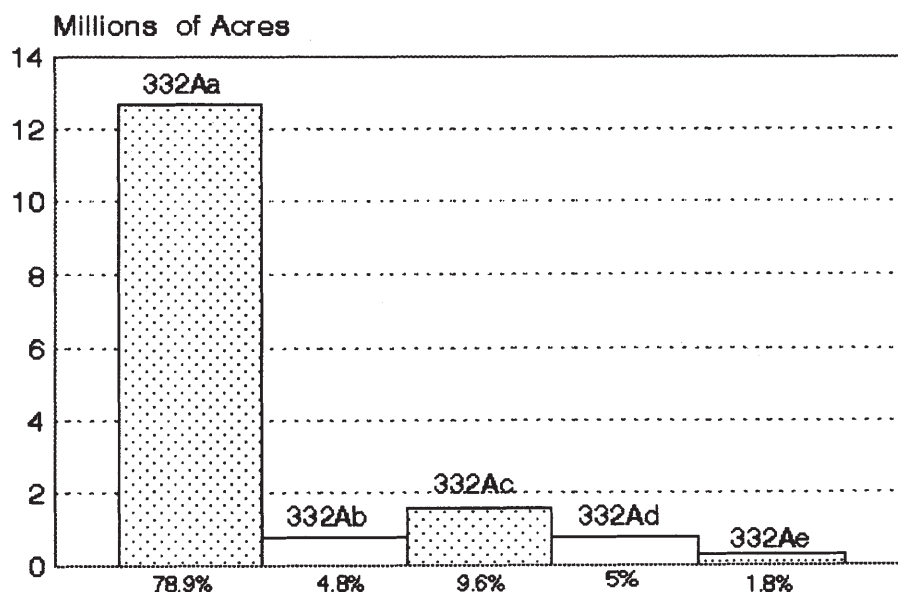
Section 332A NORTHEASTERN GLACIATED PLAINS



Subsections of Section 332A



Section 332A: Northeastern Glaciated Plains Subsection Acreages



332Aa Glaciated Drift Plains

Landscape Characteristics: Till plains, terraces, fans, and floodplains formed in glacial till. Elevations range from 1,000 to 2,000 feet. Drainage density is moderate and glacial potholes are common.

Climate: Mean annual precipitation ranges from 15 to 20 inches, about 20 to 30 percent falling as snow. The soil temperature and moisture regimes are frigid and udic.

Potential Vegetation: Wheatgrass-bluestem-needlegrass with Northern floodplain forest along major rivers and streams. Some Oak savannah also occurs.

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plains	Till	Argiborolls/Ustorthents/ Haploborolls
Terraces	Till/outwash	Argiborolls/Haploborolls
Fans/floodplains	Outwash/alluvium	Ustochrepts/Ustifluvents

Disturbance and Land Use: The primary natural disturbance is drought. Land use is evenly split between wheat farming and range/pasture.

332Ab Souris Basin

Landscape Characteristics: Glacial lake plain resulting from sedimentation on the floor of glacial Lake Souris. Some glacial potholes also occur. Elevations range from 1,000 to 1,500 feet. Drainage density is low.

Climate: Mean annual precipitation ranges from 15 to 18 inches, about 30 percent falling as snow. The soil temperature and moisture regimes are frigid and udic.

Potential Vegetation: Wheatgrass-bluestem-needlegrass

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plain	Lacustrine sediment	Argiborolls/Haploborolls/ Calciquolls/Haplaquolls

Disturbance and Land Use: The primary natural disturbance is drought. Land use is predominantly cropland.

332Ac Glaciated Outwash Plains

Landscape Characteristics: Glacial outwash plains with some till plains and moraines. Elevations range from 1,000 to 1,700 feet. Drainage density is low. Glacial potholes are common.

Climate: Mean annual precipitation ranges from 15 to 20 inches, about 40 percent falling as snow. The soil temperature and moisture regimes are frigid and udic.

Potential Vegetation: Wheatgrass-bluestem-needlegrass

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plains	Outwash/till	Argiborolls/Haploborolls/ Calciquolls/Haplaquolls

Disturbance and Land Use: The primary natural disturbance is drought. Land use is predominantly dryland farming.

332Ad Souris Sand Deltas

Landscape Characteristics: Outwash plains and fans that formed in aeolian sands, river sediments, and glacial outwash. Elevations range from 1,000 to 1,500 feet. Drainage density is low. Glacial potholes also occur.

Climate: Mean annual precipitation ranges from 15 to 18 inches, about 40 percent falling as snow. The soil temperature and moisture regimes are frigid and udic.

Potential Vegetation: Wheatgrass-bluestem-needlegrass

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plains/fans	Glacial outwash/ river sediments	Argiborolls/Haploborolls/ Calciquolls/Argialbolls

Disturbance and Land Use: The primary natural disturbance is drought. Land use is predominantly dryland farming.

332Ae Turtle Mountains

Landscape Characteristics: Hummocky hills and plains that formed in glacial till. Elevations range from 2,000 to 3,000 feet. Drainage density is moderate. Glacial potholes also occur.

Climate: Mean annual precipitation ranges from 15 to 19 inches, about 50 percent falling as snow. The soil temperature and moisture regimes are frigid and udic.

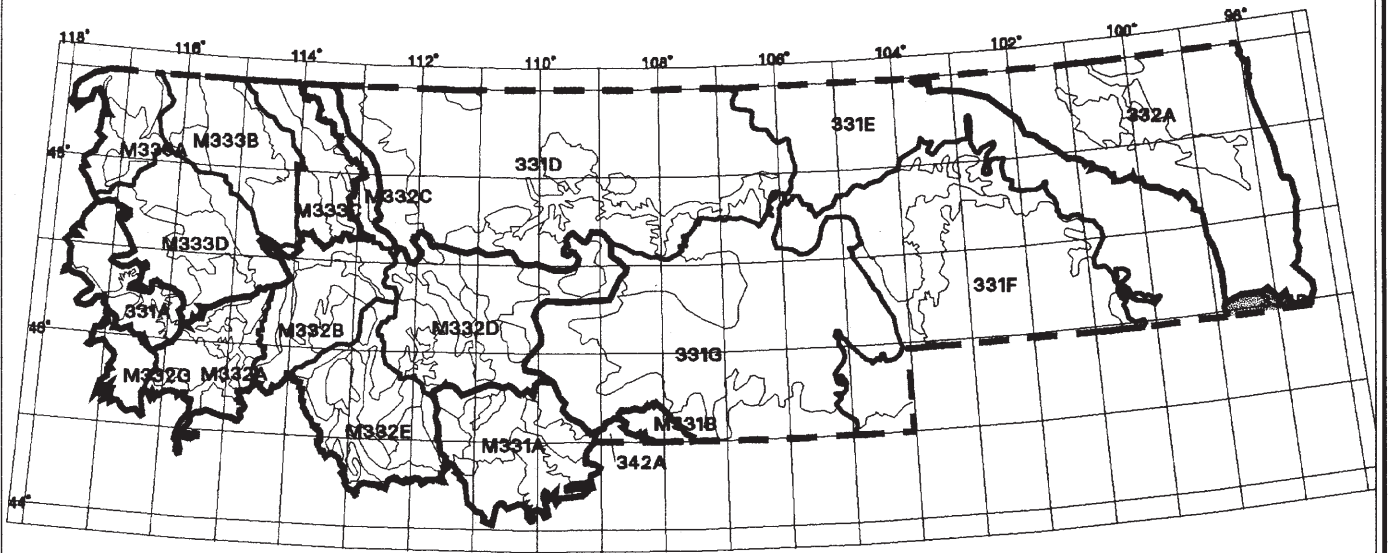
Potential Vegetation: Oak savannah

Relationships of Dominant Map Unit Components:

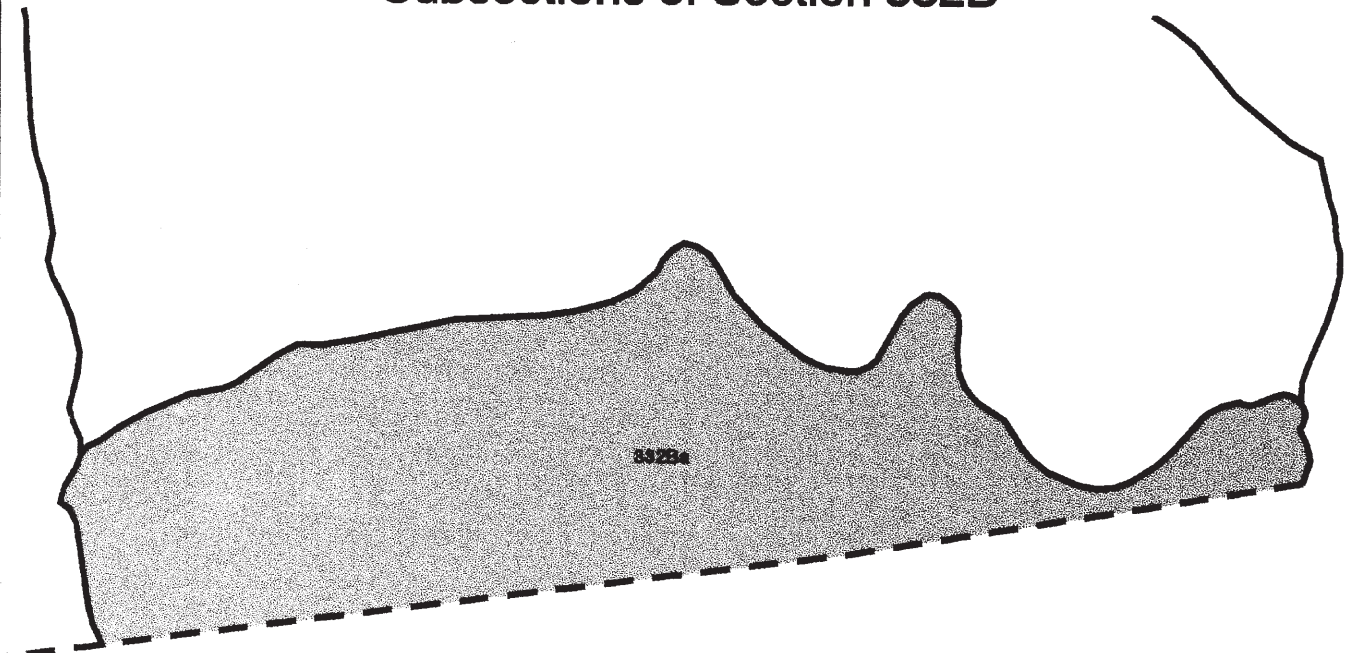
<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Hills/plains	Glacial till	Eutroboralfs/Argiborolls

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly grazing and dryland farming.

Section 332B WESTERN GLACIATED PLAINS



Subsections of Section 332B



332Ba Central Black Glaciated Plains

Landscape Characteristics: Glacial lake plain formed in glacial lacustrine sediments. Elevations range from 650 to 985 feet. Drainage density is low.

Climate: Mean annual precipitation ranges from 19 to 22 inches, about 40 percent falling as snow. The soil temperature and moisture regimes are frigid and udic.

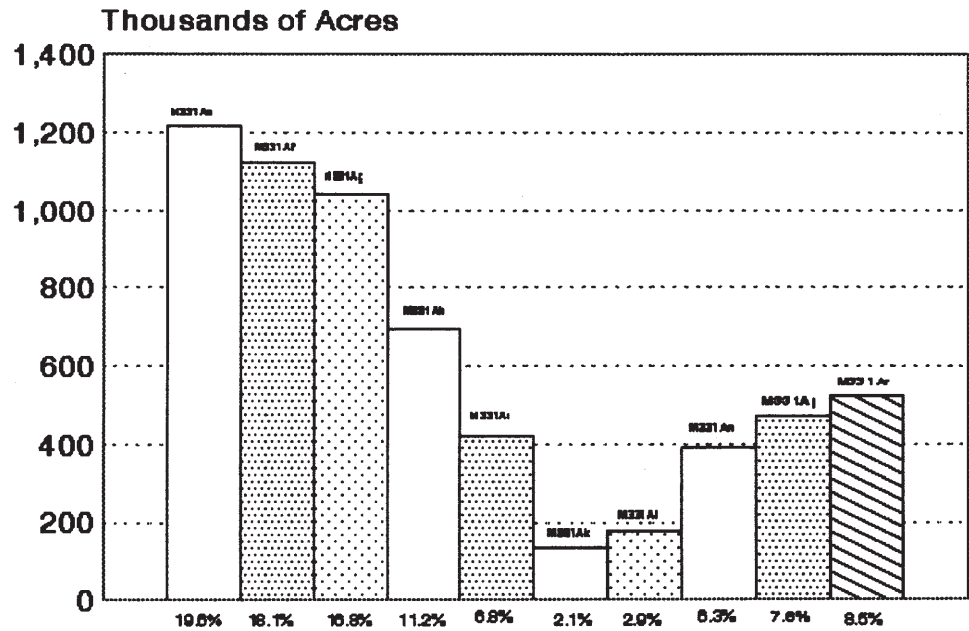
Potential Vegetation: Wheatgrass-bluestem-needlegrass

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Lake plain	Lacustrine sediments	Argiborolls/Haploborolls/ Haplaquolls

Disturbance and Land Use: The primary natural disturbance is drought and insects. Land use is predominantly dryland farming.

Section M331A: Yellowstone Highlands Subsection Acreages



M331Aa Absaroka/Gallatin Mountains

Landscape Characteristics: Steep, dissected mountains that formed in Tertiary volcanic flows and associated pyroclastic deposits. Islands of gneiss and schist also occur. Elevations range from 6,500 to 10,600 feet. Drainage density is moderate. Lakes occur in high elevation cirques.

Climate: Mean annual precipitation ranges from 50 to 110 inches, about 65 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest with Alpine meadows and barren at the highest elevations.

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ ridges	Rhyolite/basalt/ andesite	Cryochrepts/Cryoboralfs/ Cryoborolls

Disturbance and Land Use: The primary natural disturbances are fire, insects, disease and mass wasting. Land use is predominantly recreation with some grazing, timber harvest, and mining.

M331Af Yellowstone Volcanic Plateau

Landscape Characteristics: High elevation mountain plateau formed in rhyolite flows and tuff. Some surficial deposits of alluvium, glacial till, and landslide deposits also occur. Elevations range from 7,500 to 9,200 feet. Drainage density is moderate to high. There are numerous geysers, lakes, and wetlands.

Climate: Mean annual precipitation ranges from 60 to 90 inches, about 65 percent falling as snow. The soil temperature and moisture regimes are cryic and udic.

Potential Vegetation: Douglas-fir forest

Relationships of Dominant Map Unit Components:

Landform

Geology

Soil Taxa

Plateau

Rhyolite

Cryochrepts/Cryorthents

Disturbance and Land Use: The primary natural disturbances are fire, insects, disease, and geothermal activity. Land use is predominantly recreational development and tourist activities.



Figure 2— M331Af - Yellowstone Volcanic Plateau. Yellowstone Falls.

M331Ag Northern Absaroka Volcanic Mountains

Landscape Characteristics: Steep mountains and ridgetops that formed in andesitic rocks. Elevations range from 5,300 to 12,000 feet. Drainage density is high. Wetlands and riparian areas are common. Lakes occur in some high elevation cirques.

Climate: Mean annual precipitation ranges from 40 to 110 inches, about 65 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ ridges	Andesite	Cryoboralfs/Cryoborolls/ Cryochrepts
Valleys/foothills	Andesite	Cryoborolls/Cryochrepts

Disturbance and Land Use: The primary natural disturbances are fire, insects, disease, and mass wasting. Land use is predominantly recreational development. Some timber harvest and mining activities also occur.

M331Ah Beartooth Mountains

Landscape Characteristics: Steep, dissected mountains and narrow valleys that formed in gneiss and schist. Elevations range from 6,500 to 11,300 feet. Drainage density is moderate to high. Some lakes occur at higher elevations.

Climate: Mean annual precipitation ranges from 40 to 110 inches, about 55 percent falling as snow. The soil temperature and moisture regimes are cryic and udic.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest with some Alpine meadows and barren at higher elevations.

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ ridgetops	Gneiss/schist	Cryochrepts

Disturbance and Land Use: The primary natural disturbances are fire, insects, and disease. Land use is predominantly livestock grazing, timber harvest, and mining.

M331Ai Absaroka Sedimentary Mountains

Landscape Characteristics: Steep mountains with narrow valleys that formed in sedimentary and volcanic rocks. Elevations range from 5,000 to 11,000 feet. Drainage density is moderate to high.

Climate: Mean annual precipitation ranges from 40 to 80 inches, about 55 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ridges	Rhyolite/shale/ limestone	Cryochrepts/Cryoborolls/ Cryoboralfs

Disturbance and Land Use: The primary natural disturbances are fire, insects, disease, and mass wasting. Land use is predominantly recreational activities and development, and some timber harvest and mining.

M331Ak West Yellowstone Valley

Landscape Characteristics: Intermontane valley formed by the Madison River in valley fill, terrace deposits, and some glacial drift. Elevations range from 6,500 to 7,000 feet. Drainage density is moderate. Hebgen Lake is in this subsection.

Climate: Mean annual precipitation ranges from 45 to 55 inches, about 45 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Valley/terraces/floodplains	Alluvium	Cryochrepts/Cryorthents

Disturbance and Land Use: The primary natural disturbances are fire and flooding. Land use is predominantly recreational development with some mining, grazing, and timber harvest.

M331Al Upper Yellowstone Valley

Landscape Characteristics: Valley floor, terraces, toeslopes, and foothills that formed in alluvium and Tertiary sedimentary and volcanic rocks. Elevations range from 4,500 to 7,500 feet. Drainage density is moderate and wetlands are fairly common.

Climate: Mean annual precipitation ranges from 15 to 40 inches, about 55 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic.

Potential Vegetation: Foothills prairie

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Valley floor/terraces	Alluvium	Haploborolls/Camborthids
Foothills/toeslopes	Tertiary volcanics	Argiborolls/Haploborolls

Disturbance and Land Use: The primary natural disturbance is flooding. Land use is predominantly recreational development, with some agriculture and livestock grazing.

M331Am Gallatin Foothills/Spanish Peaks

Landscape Characteristics: Steep, dissected mountains and rolling foothills that formed in sedimentary and metamorphic rocks. Elevations range from 5,000 to 10,500 feet. Drainage density is moderate to high.

Climate: Mean annual precipitation ranges from 20 to 100 inches, about 60 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountains	Sandstone/shale/ limestone	Cryochrepts/Cryoboralfs
Foothills	Gneiss/schist	Cryoborolls/Argiborolls/ Fluvaquents

Disturbance and Land Use: The primary natural disturbances are fire, insects, disease, and some mass wasting. Land use is predominantly timber harvest, livestock grazing, and ranching.

M331Ap Madison Mountains

Landscape Characteristics: Steep mountains that formed in predominantly sedimentary rock with some included volcanic rock. Elevations range from 7,500 to 11,200 feet. Drainage density is moderate. Lakes occur in the high elevation cirque basins.

Climate: Mean annual precipitation ranges from 50 to 100 inches, about 65 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest with some Alpine meadows and barren at the highest elevations.

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ridges	Sandstone/shale/ limestone/diorite	Cryochrepts/Cryoboralfs/ Cryoborolls

Disturbance and Land Use: The primary natural disturbances are fire, insects, and disease. Land use is predominantly timber harvest, mining, and some livestock grazing.

M331Ar Beartooth Front

Landscape Characteristics: Rolling to steep, dissected foothills and mountain fronts that formed in gneiss and schist. Elevations range from 5,000 to 11,300 feet. Drainage density is high.

Climate: Mean annual precipitation ranges from 20 to 50 inches, about 45 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

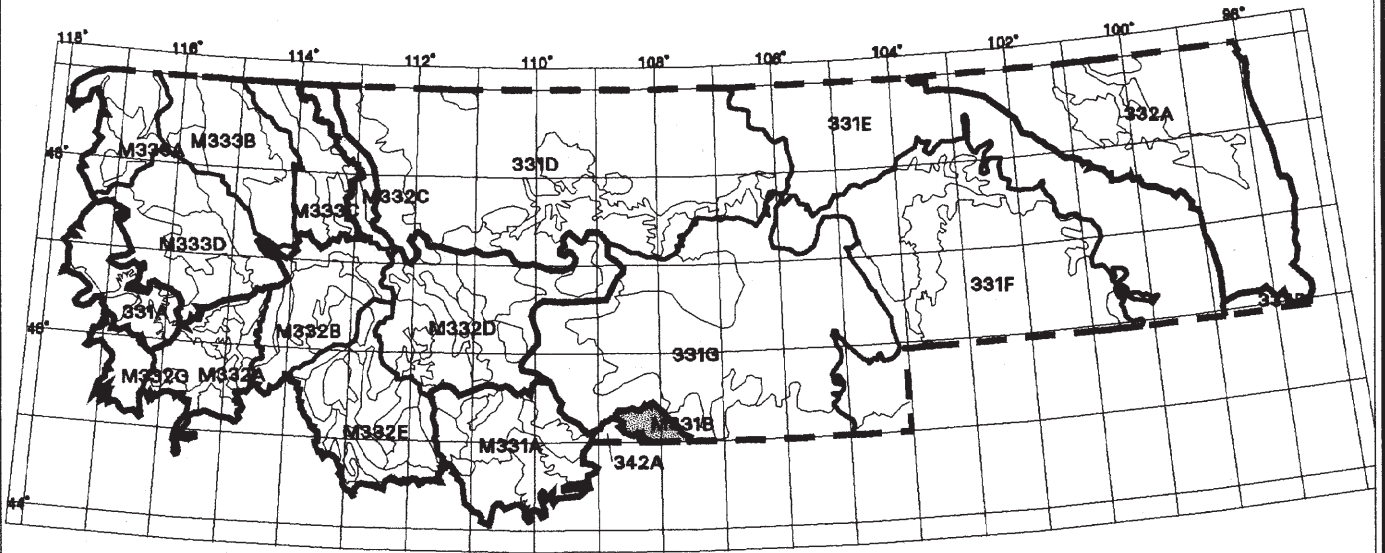
Potential Vegetation: Foothills prairie/Douglas-fir forest

Relationships of Dominant Map Unit Components:

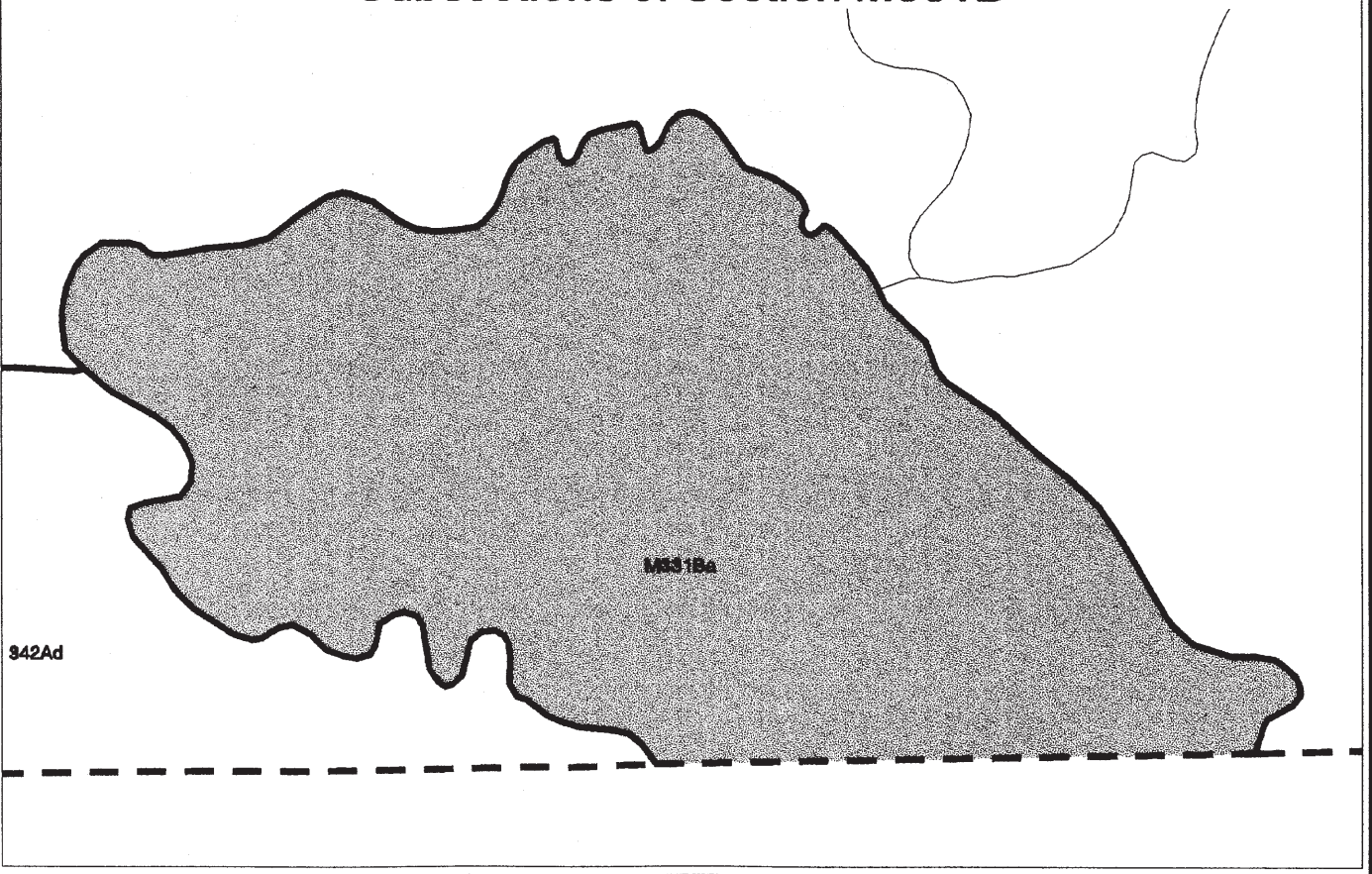
<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountain fronts/foothills	Gneiss/schist	Cryoborolls/Cryochrepts

Disturbance and Land Use: The primary natural disturbances are fire, insects, and disease. Land use is predominantly livestock grazing, agriculture, and some timber harvest and mining.

Section M331B BIGHORN MOUNTAINS



Subsections of Section M331B



M331Ba Bighorn Sedimentary Mountains

Landscape Characteristics: Mountainsides, foothills, fans, and terraces that formed in limestone, sandstone, and shale. Some landslide deposits also occur. Elevations range from 5,000 to 10,500 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 15 to 35 inches, about 40 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

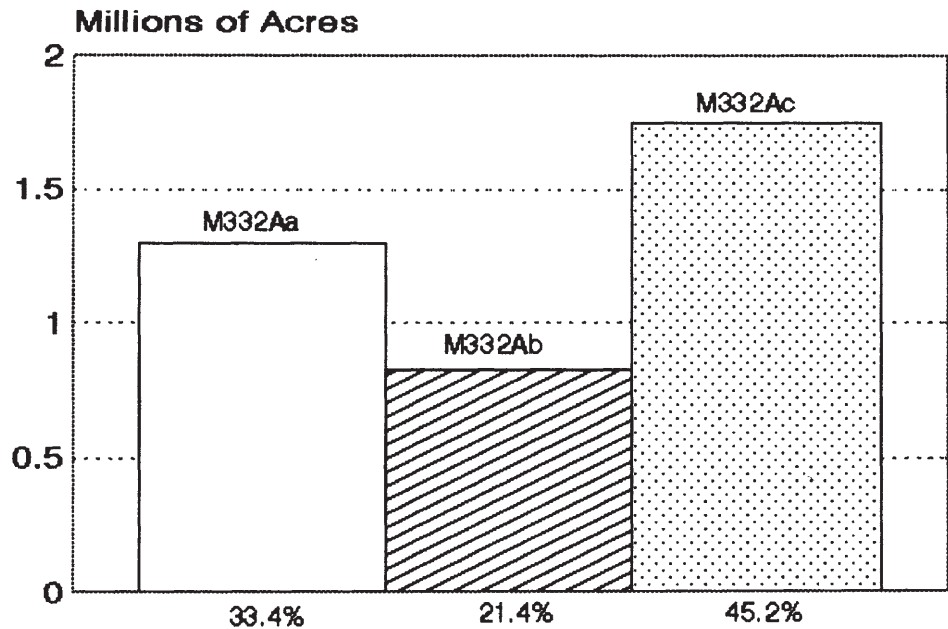
Potential Vegetation: Douglas-fir forest/Foothills prairie

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides	Sedimentary	Cryoborolls/Cryoboralfs
Foothills	Sedimentary	Argiborolls/Haploboralfs
Fans/terraces	Sedimentary	Cryoborolls/Argiborolls

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly livestock grazing and timber harvest.

Section M332A: Idaho Batholith Subsection Acreages



M332Aa Lochsa/Salmon Breaklands

Landscape Characteristics: Highly dissected stream breaklands formed in gneiss, schist, and granitic rocks. Volcanic ash-influenced loess covers some areas. Elevations range from 1,400 to 7,000 feet. Drainage density is high.

Climate: Mean annual precipitation ranges from 20 to 60 inches, about 60 percent falling as snow. The soil temperature and moisture regimes are frigid and typic xeric.

Potential Vegetation: Western ponderosa forest/Grand fir-Douglas-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Stream breaklands	Loess/schist/gneiss/ granite	Udivitrands/Haploxerolls/ Haplumbrepts
Valley floor/terraces	Alluvium	Xerofluvents/Udivitrands/ Haploxerolls

Disturbance and Land Use: The primary natural disturbances are fire, insects, disease, and mass wasting. Land use includes livestock grazing, mining, and timber harvest.



Figure 3—M332Aa - Lochsa/Salmon Breaklands (foreground) with M332Ac - Central Idaho Mountains and Basins (background).

M332Ab Central Idaho Glaciated Mountains

Landscape Characteristics: Glaciated mountain slopes, ridges, and cirquelands that formed in quartz monzonite, gneiss, and granite. Many surface soils are influenced by volcanic ash. Elevations range from 3,000 to 8,500 feet. Drainage density is moderate. Lakes occur in cirque basins and on glacial valley floors.

Climate: Mean annual precipitation ranges from 35 to 70 inches, about 60 to 70 percent falling as snow. The soil temperature and moisture regimes are cryic and udic.

Potential Vegetation: Western spruce-fir forest/Grand fir-Douglas-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Valleys/terraces/ moraines	Alluvium/loess	Vitricryands/Cryaquepts/ Cryochrepts
Glaciated mountain slopes and ridges	Granitic rocks/till	Cryochrepts/Cryoboralfs/ Vitricryands
Cirqueland	Granitic rocks	Cryochrepts

Disturbance and Land Use: The primary natural disturbances are fire, insects, disease, and mass wasting. Because much of the subsection is either roadless or designated wilderness, human disturbances are slight.

M332Ac Central Idaho Mountains and Basins

Landscape Characteristics: Uplands, broad basins, and breaklands that formed gneiss, schist, and granitic rocks. Volcanic ash caps occur throughout the area. Elevations range from 1,600 to 8,200 feet. Drainage density is moderate to high. Wetlands occur throughout the subsection associated with glacial till. Lakes occur in high elevation cirques.

Climate: Mean annual precipitation ranges from 25 to 80 inches, about 60 percent falling as snow. The soil temperature and moisture regimes are cryic and udic.

Potential Vegetation: Western spruce-fir forest/Grand fir-Douglas-fir forest

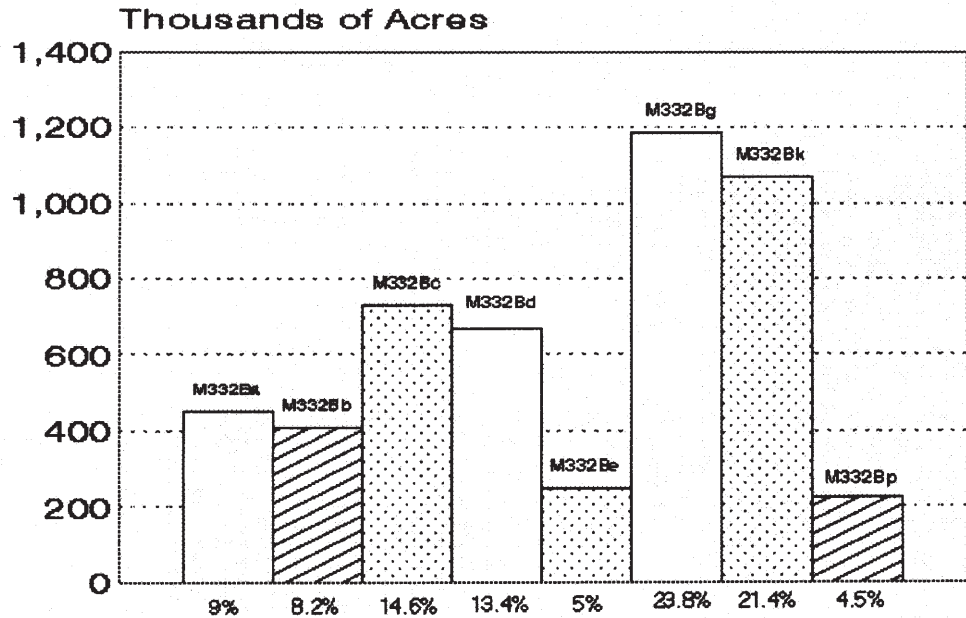
Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Uplands/cirquelands	Granitic rocks/till	Cryochrepts/Vitricryands/ Dystrochrepts/Cryoboralfs
Basins/terraces/ floodplains	Till/colluvium/ alluvium	Aquands/Cryands/Cryochrepts/ Dystrochrepts
Breaklands	Granitic rocks/ colluvium	Dystrochrepts/Haploxerolls

Disturbance and Land Use: The primary natural disturbances are fire, insects, disease, and mass wasting. Land use is predominantly timber harvest and mining.

Section M332B: Bitterroot Valley

Subsection Acreages



M332Ba Bitterroot Glaciated Canyons

Landscape Characteristics: Glaciated mountains with numerous heavily glaciated parallel canyons. The dominant parent material is till derived from quartz monzonite, granodiorite, gneiss, and schist. Elevations range from 4,000 to 10,000 feet. Drainage density is moderate. Numerous lakes occur in high elevation cirques.

Climate: Mean annual precipitation ranges from 14 to 70 inches, about 60 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic (udic at higher elevations).

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Cirquelands/moraines/ trough walls	Till/talus/ granitic rocks	Cryochrepts/Cryaquepts
Moraines/terraces/ floodplains	Till/alluvium	Cryochrepts/Cryaquepts/ Cryaquepts
Dipslopes	Granitic rocks	Argiborolls/Cryochrepts

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly wilderness. Some timber harvest and grazing occurs on the eastern dipslope.

M332Bb Bitterroot/Frenchtown Valleys

Landscape Characteristics: Intermontane valleys that formed in alluvium, outwash, and lacustrine sediments. Elevations range from 3,000 to 4,400 feet. Drainage density is slight. Wetlands occur along both the Clark Fork and Bitterroot rivers.

Climate: Mean annual precipitation ranges from 11 to 25 inches, about 40 to 60 percent falling as snow. The soil temperature and moisture regimes are frigid and typic ustic.

Potential Vegetation: Foothills prairie/Western ponderosa forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Foothills	Valley fill	Eutroboralfs
Terraces/fans	Alluvium/outwash	Argiborolls/Haploborolls
Floodplains	Alluvium	Udifuvents/Endoaquents/ Haplaquolls/Endoaquolls

Disturbance and Land Use: The primary natural disturbances are flooding and fire. Land use is predominantly extensive urban/suburban development and agricultural activities.

M332Bc South Anaconda/Bitterroot Mountains

Landscape Characteristics: Mountains that formed in granitic rocks with some glaciation at higher elevations. Elevations range from 3,800 to 8,800 feet. Drainage density is moderate. Lakes occur in a few high elevation cirques.

Climate: Mean annual precipitation ranges from 16 to 55 inches, about 60 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ ridges	Granitic rocks/ colluvium	Argiborolls/Cryochrepts/ Cryoboralfs/Ustochrepts
Cirquelands	Granitic rocks/talus	Cryochrepts
Floodplains/terraces	Alluvium/outwash	Cryochrepts/Cryaquents

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly timber harvest, grazing, and some mining.

M332Bd Anaconda/Flint Creek Mountains

Landscape Characteristics: Glaciated fault block mountains that formed from complexly folded and faulted sedimentary and igneous rocks. Elevations range from 4,000 to 10,200 feet. Drainage density is moderate to high. Lakes are common in cirque basins.

Climate: Mean annual precipitation ranges from 11 to 50 inches, about 55 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Foothills prairie

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Ridges/cirqueland	Mixed sedimentary/ metasedimentary/ granite	Cryochrepts/Cryorthents
Mountainsides/benches	Mixed sedimentary/ metasedimentary/ volcanic	Cryoborolls/Cryoboralfs/ Cryochrepts

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly timber harvest, grazing, mining, and suburban development.

M332Be Flint Creek/Upper Willow Creek Basins

Landscape Characteristics: Structural basins and low relief uplands that formed in lacustrine deposits, alluvium, metasedimentary, and volcanic rocks. Elevations range from 4,000 to 7,000 feet. Drainage density is moderate. Wetlands are fairly common within the basins.

Climate: Mean annual precipitation ranges from 11 to 20 inches, about 30 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic. Frigid temperatures occur at lower elevations.

Potential Vegetation: Douglas-fir forest/Foothills prairie

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Basins/terraces/ fans/floodplains	Alluvium/colluvium	Cryoborolls/Cryoboralfs/ Argiborolls/Haploborolls
Uplands	Quartzite/argillite/ limestone	Cryoboralfs/Cryochrepts/ Haploborolls/Argiborolls

Disturbance and Land Use: The primary natural disturbances are fire and flooding. Land use is predominantly mining, timber harvest, grazing, hay production, and suburban development.



Figure 4—M332Bg - Garnet/Sapphire Mountains and M332Ba - Bitterroot Glaciated Canyons. Sapphire mountain foothills are in the foreground with the Bitterroot Mountains in the background.

M332Bg Garnet/Sapphire Mountains

Landscape Characteristics: Mountains, hills, moraines, and valleys that formed in till, sedimentary, and igneous rocks. Glaciation has modified parts of this subsection. Elevations range from 3,200 to 8,800 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 13 to 55 inches, about 50 to 60 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic. Frigid temperatures occur at lower elevations.

Potential Vegetation: Douglas-fir forest/Western ponderosa forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Glaciated uplands/ cirquelands	Gneiss/quartzite/ argillite/talus	Cryochrepts
Mountainsides/ridges	Limestone/igneous	Cryoboralfs/Cryochrepts/ Ustochrepts
Moraines/foothills	Till/alluvium	Eutroborelfs/Ustochrepts

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly timber harvest, grazing, mining, and recreational development.

M332Bk Rattlesnake/Blackfoot/South Swan Mountains

Landscape Characteristics: Mountains and moraines that formed in quartzite, argillite, and till. Elevations range from 5,000 to 8,500 feet. Drainage density is moderate to high. Lakes occur in the glacial knob and kettle topography. Some high elevation cirque lakes also occur.



Figure 5— M332Bk - Rattlesnake/Blackfoot/South Swan Mountains. Arrastra Valley.

Climate: Mean annual precipitation ranges from 35 to 80 inches, about 60 percent falling as snow. The soil temperature and moisture regimes are cryic (frigid at the lower elevations) and typic ustic/udic.

Potential Vegetation: Western ponderosa forest/Douglas-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ridges	Quartzite/argillite	Cryochrepts/Cryoboralfs
Moraines/knob and kettle topography	Till/outwash	Eutroboralfs/Eutrochrepts

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly timber harvest and recreational development.

M332Bp Avon/Nevada Valleys

Landscape Characteristics: Intermontane valleys that formed in glacial outwash, alluvium, and till. Elevations range from 3,200 to 5,000 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 15 to 19 inches, about 40 percent falling as snow. The soil temperature and moisture regimes are frigid and typic ustic.

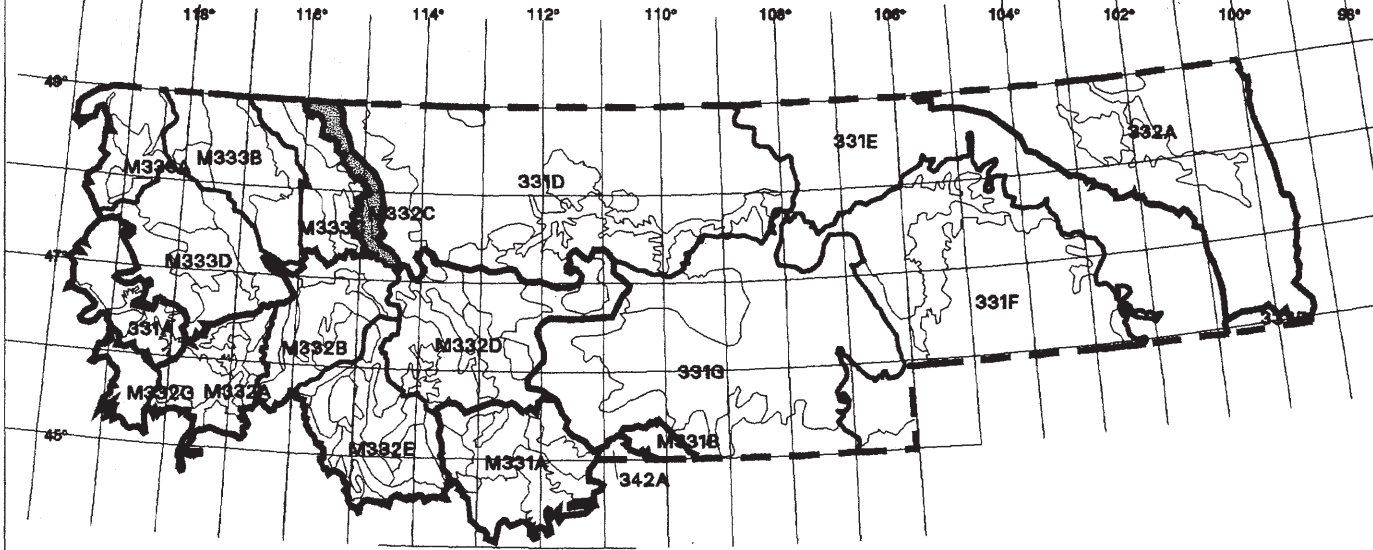
Potential Vegetation: Foothills prairie

Relationships of Dominant Map Unit Components:

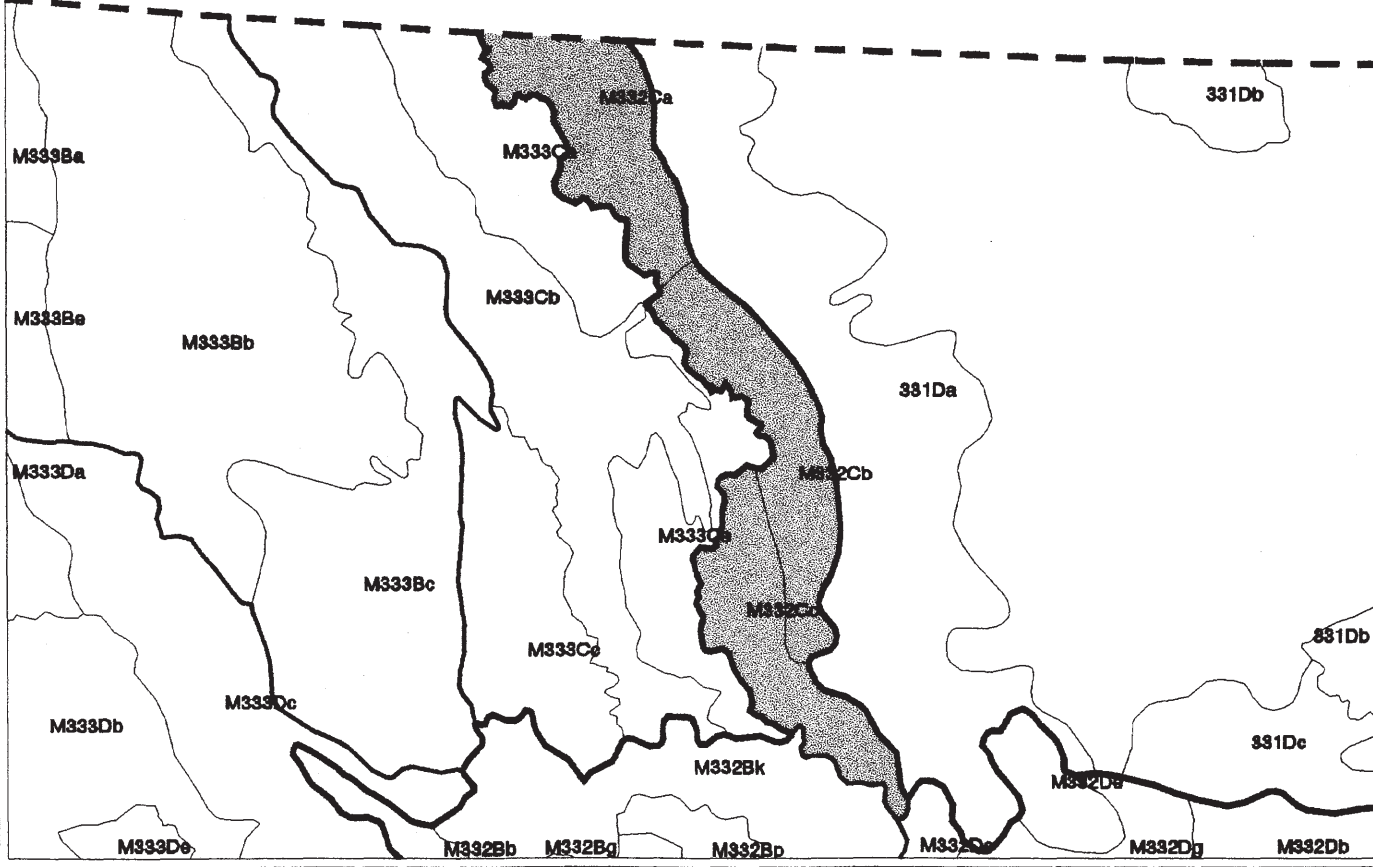
<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Floodplains/terraces/ ground moraines	Outwash/alluvium/ till	Haplaquolls/Haploborolls/ Argiborolls

Disturbance and Land Use: The primary natural disturbance is flooding. Land use is predominantly agriculture and livestock grazing.

Section M332C ROCKY MOUNTAIN FRONT

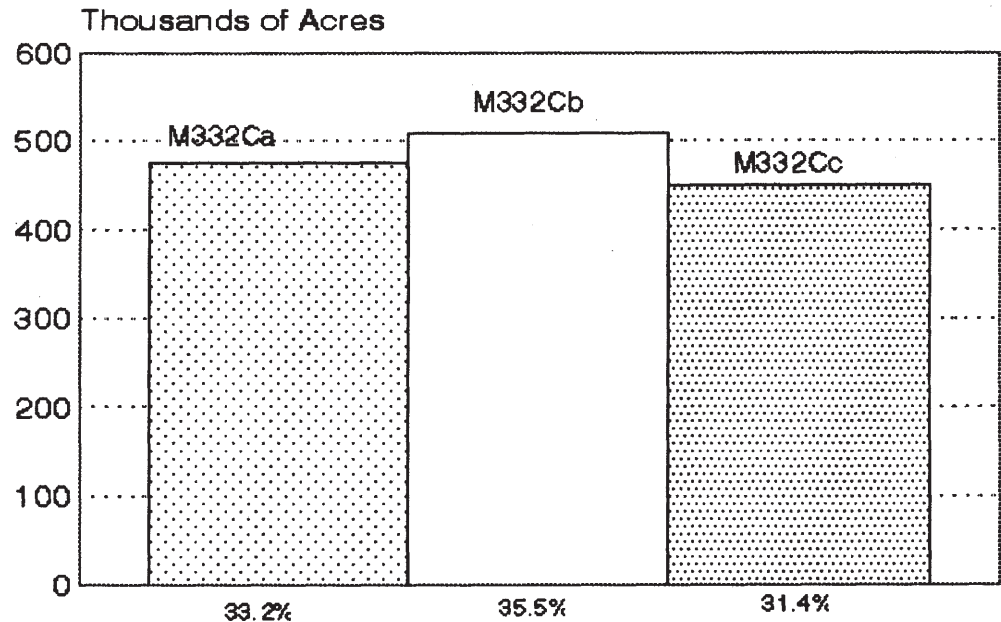


Subsections of Section M332C



Section M332C: Rocky Mountain Front

Subsection Acreages



M332Ca North Rocky Mountain Front

Landscape Characteristics: Thrust faulted mountains that formed from argillite, siltite, and quartzite. Elevations range from 5,000 to 10,800 feet. Drainage density is high. High mountain lakes are common and there are existing glaciers. This subsection drains into Hudson Bay.

Climate: Mean annual precipitation ranges from 27 to 90 inches, about 50 to 70 percent falling as snow. The soil temperature and moisture regimes are cryic and udic (typic ustic at lower elevations). Chinook winds are common along the mountain front.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/moraines/ outwash terraces	Argillite/siltite/ till	Cryocrepts/Cryoborolls
Cirquelands	Argillite/siltite/ till/talus	Cryorthents

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly recreation because this subsection is within Glacier National Park.

M332Cb Middle Rocky Mountain Front

Landscape Characteristics: Thrust faulted and folded mountains that formed from mudstone, sandstone, and lesser amounts of limestone and dolomite. Elevations range from 5,000 to 9,000 feet. Drainage density is high.

Climate: Mean annual precipitation ranges from 20 to 60 inches, about 50 to 70 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic. Chinook winds are common along the mountain front.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest with Foothills prairie on drier south and west lower slopes.

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/moraines/ outwash terraces	Mudstone/sandstone/ till	Cryochrepts/Cryoboralfs/ Cryoborolls
Cirquelands	Mudstone/sandstone	Cryorthents

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly recreational activities.



Figure 6—M332Cb - Middle Rocky Mountain Front.
Hannon Gulch and Sun River.

M332Cc South Rocky Mountain Front

Landscape Characteristics: Faulted mountains that formed from limestone, dolomite, and quartzite. Argillite and diorite sills occur. Elevations range from 5,400 to 9,000 feet. Drainage density is high.

Climate: Mean annual precipitation ranges from 22 to 60 inches, about 50 to 70 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

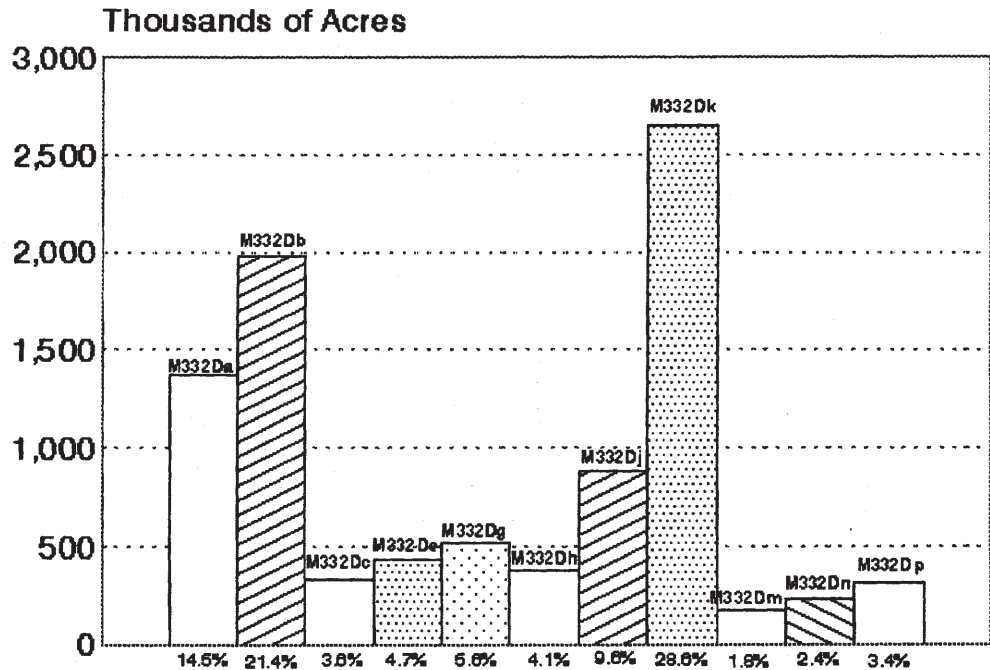
Potential Vegetation: Douglas-fir forest/Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/moraines/ outwash terraces	Limestone/dolomite/ till	Cryochrepts/Cryoboralfs
Cirquelands	Limestone/dolomite	Cryorthents

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly recreational activities.

Section M332D: Belt Mountains Subsection Acreages



M332Da Snowy Foothills

Landscape Characteristics: Rolling foothills and associated valleys that formed in sandstone and shale. Elevations range from 3,500 to 5,000 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 15 to 19 inches, about 60 percent falling as snow. The soil temperature and moisture regimes are frigid and typic ustic.

Potential Vegetation: Eastern ponderosa forest/Foothill prairie

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Foothills	Sandstone/shale	Argiborolls/Haploborolls
Floodplains/terraces	Alluvium	Ustifluvents/Haploborolls

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly livestock grazing.



Figure 7—M332Db - Little Belt/Snowy/Judith Mountains.
Northwest Little Belts.

M332Db Little Belt/Snowy/Judith Mountains

Landscape Characteristics: Uplifted mountains that formed predominantly in limestone, sandstone, and shale. Igneous rocks intrude into the uplifted limestone and are exposed at higher elevations. Elevations range from 3,500 to 9,200 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 13 to 42 inches, about 40 to 60 percent falling as snow. The soil temperature and moisture regimes are cryic (frigid at lower elevations) and typic ustic.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/fans/ ridges	Limestone/sandstone/ shale	Cryoboralfs/Cryochrepts
Alpine slopes/ridges/ talus	Igneous/metamorphic	Cryochrepts

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly timber harvest, mining, and recreational development.

M332Dc Crazy Mountains

Landscape Characteristics: Uplifted mountains that formed in sandstone and mudstone with a central core of igneous intrusive rock. Elevations range from 6,000 to 11,000 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 15 to 60 inches, about 70 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Structural uplands	Sandstone/mudstone/ till	Cryoboralfs
Cirquelands	Igneous rock/till	Cryochrepts

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly timber harvest and suburban development.

M332De Continental Divide Foothills

Landscape Characteristics: Foothills that formed in metasedimentary and volcanic rocks. Elevations range from 4,500 to 7,100 feet. Drainage density is moderate to high.

Climate: Mean annual precipitation ranges from 12 to 25 inches, about 30 percent falling as snow. The soil temperature and moisture regimes are frigid (cryic at higher elevations) and typic ustic.

Potential Vegetation: Douglas-fir forest/Foothills prairie

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Foothills	Metasedimentary/ volcanic	Haploborolls/Cryoborolls/ Argiborolls/Eutroboralfs

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly livestock grazing and timber harvest.

M332Dg Big Belt Foothills

Landscape Characteristics: Foothills and lower slopes of the Big Belt mountains that formed in limestone. Elevations range from 3,500 to 5,000 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 10 to 25 inches, about 40 percent falling as snow. The soil temperature and moisture regimes are frigid (cryic at higher elevations) and typic ustic.

Potential Vegetation: Douglas-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Foothills	Limestone	Ustochrepts/Haploborolls
Mountainsides	Limestone	Cryochrepts/Cryoborolls

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly grazing and timber harvest.

M332Dh Big Belt Mountains

Landscape Characteristics: Mountains that formed in limestone, shale, and granite. The granite intrusions have been glaciated. Elevations range from 4,000 to 9,500 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 15 to 40 inches, about 50 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Foothills prairie

Relationships of Dominant Map Unit Components:

Landform

Mountainsides/ridges/
terraces

Geology

Limestone/shale/
granite

Soil Taxa

Cryoboralfs/Cryochrepts/
Argiborolls

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly livestock grazing, timber harvest, and mining.



Figure 8—M332Dj - Boulder/Elkhorn Mountains. Elkhorn Mountains.

M332Dj Boulder/Elkhorn Mountains

Landscape Characteristics: Mountains that formed in granitic and volcanic bedrock. Much of the area has been glaciated. Elevations range from 4,500 to 9,400 feet. Drainage density is high.

Climate: Mean annual precipitation ranges from 13 to 30 inches, about 20 percent falling as snow. The soil temperature and moisture regimes are frigid (cryic at higher elevations) and typic ustic.

Potential Vegetation: Douglas-fir forest/Foothills prairie

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides	Granitic/volcanic	Cryochrepts/Cryoboralfs/ Argiborolls/Haploborolls
Glaciated uplands/ troughs	Till/granite	Cryochrepts/Cryoboralfs

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly grazing, timber harvest, mining, and suburban development.

M332Dk Central Montana Broad Valleys

Landscape Characteristics: Broad intermontane valleys that formed in Tertiary sediments and Quaternary alluvial deposits derived from volcanic rocks, shale, and sandstone. Elevations range from 3,750 to 6,800 feet. Drainage density is low.

Climate: Mean annual precipitation ranges from 10 to 25 inches, about 30 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic.

Potential Vegetation: Foothills prairie/Grama-needlegrass-wheatgrass/Sagebrush steppe

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Terraces/fans/ foothills	Alluvium	Argiborolls/Haploborolls/ Calciorrhids/Haplargids
Floodplains	Alluvium	Haplaquolls/Fluvaquents

Disturbance and Land Use: The primary natural disturbances are fire and flooding. Land use is predominantly livestock grazing, crop production, and urban/suburban development.

M332Dm South Elkhorn Mountains

Landscape Characteristics: Mountains and foothills that formed in limestone, dolomite, argillite, andesite, sandstone, and quartzite. Elevations range from 4,500 to 7,500 feet. Drainage density is low.

Climate: Mean annual precipitation ranges from 12 to 22 inches, about 30 percent falling as snow. The soil temperature and moisture regimes are frigid (cryic at higher elevations) and aridic ustic.

Potential Vegetation: Foothills prairie/Douglas-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ridges	Mixed sedimentary/ metamorphic	Cryoborolls/Cryochrepts
Foothills/terraces	Mixed sedimentary/ metamorphic	Calciorthids/Torriorthents/ Argiborolls

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly livestock grazing and timber harvest.

M332Dn North Tobacco Root Mountains and Foothills

Landscape Characteristics: Complex faulted mountains and foothills that formed in gneiss, volcanic, and a variety of sedimentary bedrock. Elevations range from 4,200 to 8,000 feet. Drainage density is high.

Climate: Mean annual precipitation ranges from 10 to 25 inches, about 35 percent falling as snow. The soil temperature and moisture regimes are frigid (cryic at higher elevations) and aridic ustic.

Potential Vegetation: Douglas-fir forest/Foothills prairie

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ridges	Sedimentary/ metasedimentary	Cryoboralfs/Cryochrepts/ Cryoborolls
Foothills	Gneiss/volcanic/ metasedimentary	Ustochrepts/Argiborolls/ Haploborolls/Camborthids

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly livestock grazing and timber harvest.

M332Dp Bridger Mountains and Foothills

Landscape Characteristics: Mountains and foothills that formed in sedimentary and metasedimentary bedrock. Elevations range from 5,000 to 9,000 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 25 to 80 inches, about 60 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

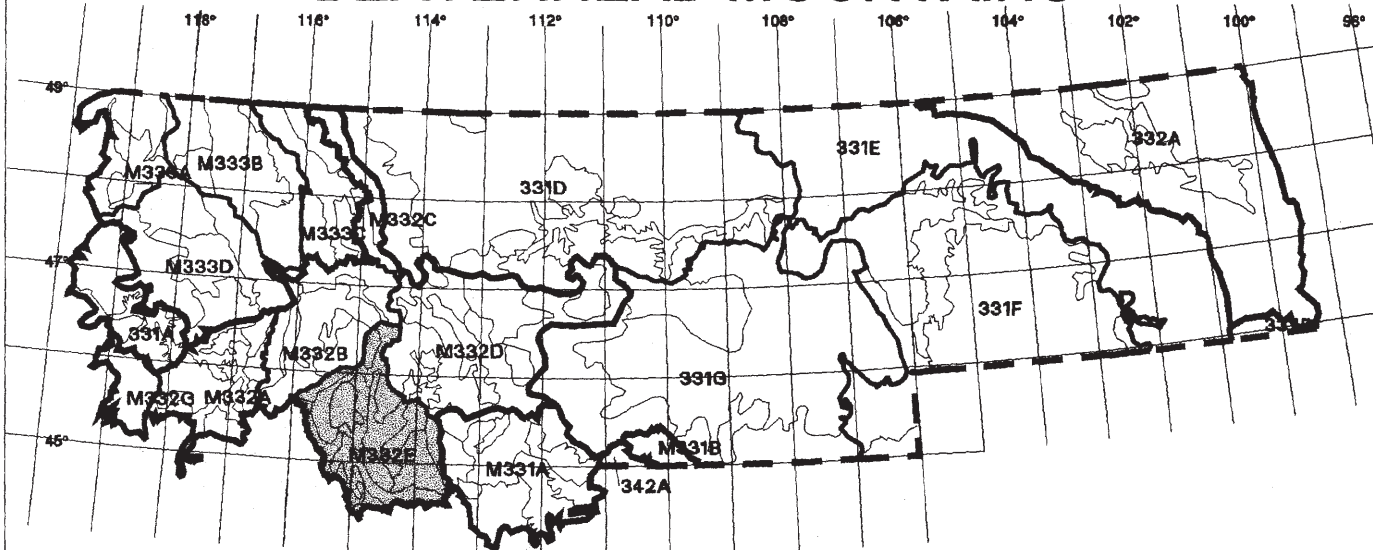
Potential Vegetation: Douglas-fir forest/Western spruce-fir forest/Foothills prairie

Relationships of Dominant Map Unit Components:

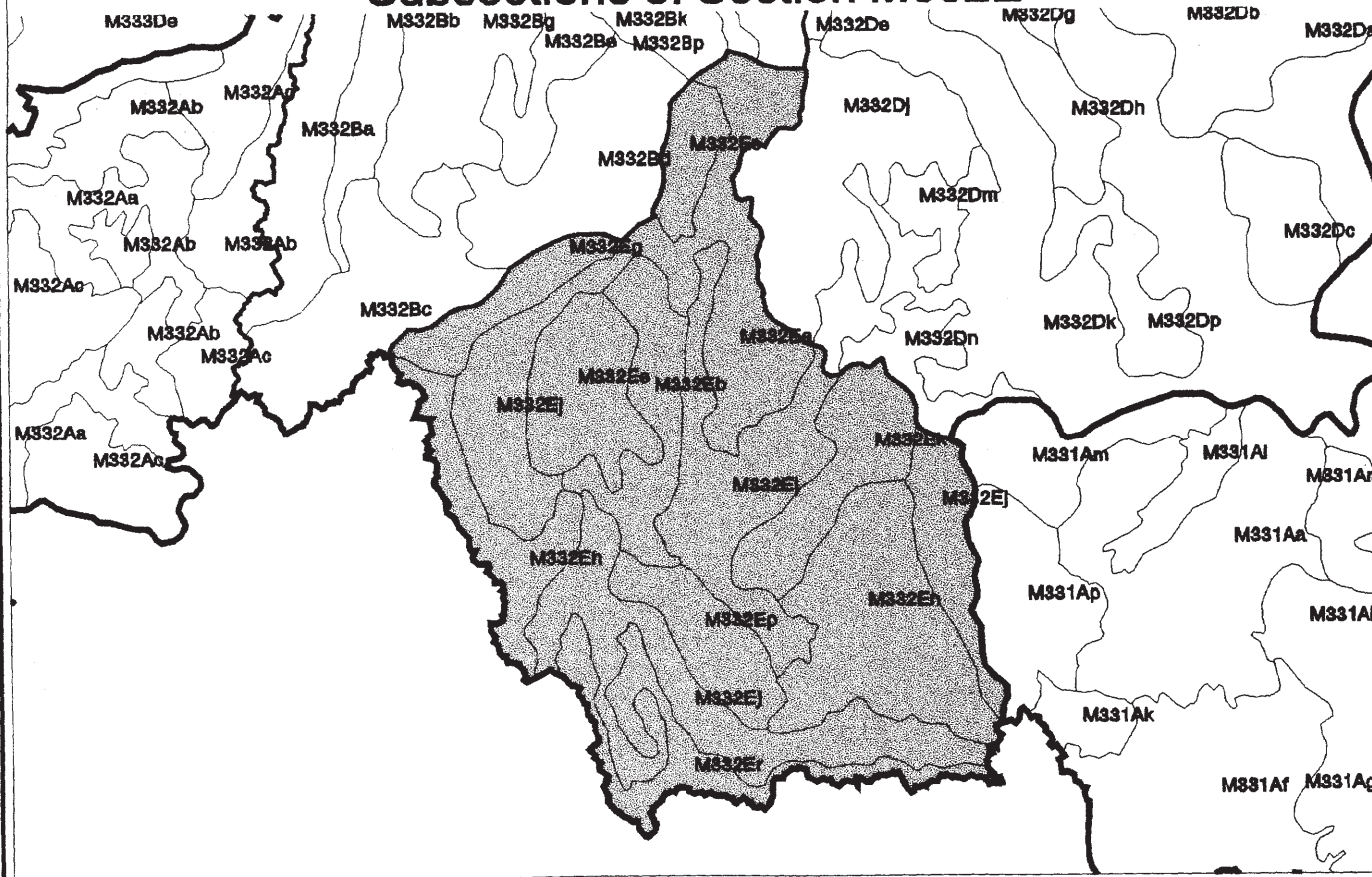
<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ridges	Sandstone/shale/ limestone/volcanics/ conglomerate	Cryoborolls/Cryoboralfs/ Cryochrepts
Foothills	Sandstone/shale/ limestone	Cryoborolls/Cryoboralfs/ Cryochrepts/Argiborolls

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly timber harvest, mining, grazing, and recreational development.

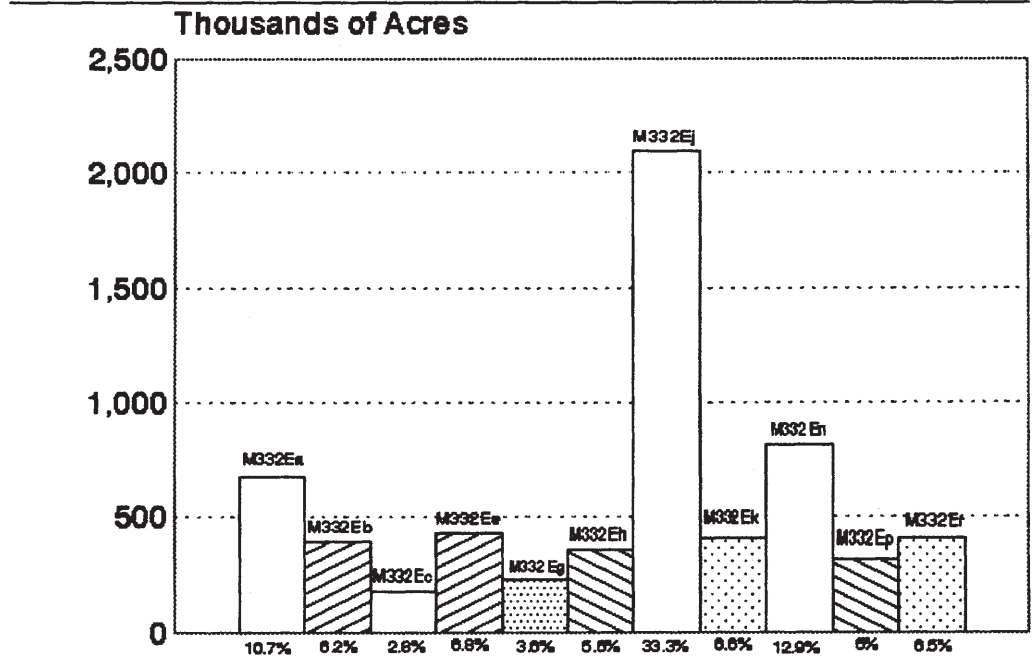
Section M332E BEAVERHEAD MOUNTAINS



Subsections of Section M332E



Section M332E: Beaverhead Mountains Subsection Acreages



M332Ea Continental Divide Uplands

Landscape Characteristics: Block faulted mountains that formed in a variety of igneous, sedimentary, and metasedimentary rocks. Elevations range from 5,300 to 10,200 feet. Drainage density is moderate to high.

Climate: Mean annual precipitation ranges from 10 to 30 inches, about 15 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Foothills prairie/Alpine meadows and barren

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountain slopes/ foothills	Gneiss/limestone/ granite	Cryoboralfs/Cryoborolls/ Cryochrepts
Alpine ridges/plateaus/ cirquelands	Gneiss/schist/ granite	Cryorthents/Cryochrepts

Disturbance and Land Use: The primary natural disturbances are fire and mass wasting. Land use is predominantly livestock grazing, mining, timber harvest, and recreational use and development.

M332Eb East Pioneer Mountains

Landscape Characteristics: Block faulted mountains that formed predominantly in limestone. Alpine glaciation has modified much of the landscape. Elevations range from 6,000 to 9,500 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 10 to 20 inches, about 20 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest/Alpine meadows and barren

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ uplands	Limestone/granite/ volcanics	Cryoborolls/Cryochrepts/ Cryoboralfs
Alpine slopes/ridges	Limestone/granite/ volcanics	Cryoborolls/Cryochrepts/ Cryorthents

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly timber harvest and livestock grazing.

M332Ec Deerlodge Valley

Landscape Characteristics: Intermontane valley that formed in Tertiary sedimentary rocks and recent stream deposits. Elevations range from 4,400 to 6,000 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 11 to 16 inches, about 20 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic.

Potential Vegetation: Sagebrush steppe/Foothills prairie

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Floodplains	Alluvium	Haplaquolls/Argiborolls/ Haploborolls
Terraces	Alluvium	Argiborolls/Calciborolls/ Haploborolls
Alluvial fans/ pediments	Sedimentary rock	Argiborolls/Haploborolls

Disturbance and Land Use: The primary natural disturbances are flooding and mass wasting. Land use is predominantly agriculture, livestock grazing, and urban/suburban development.

M332Ee West Pioneer Mountains

Landscape Characteristics: Block faulted mountains that formed in granite, gneiss, and a variety of sedimentary and metasedimentary rocks. Elevations range from 5,500 to 10,200 feet. Drainage density is moderate to high.

Climate: Mean annual precipitation ranges from 15 to 30 inches, about 35 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest/Sagebrush steppe

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides	Granite/gneiss/ argillite	Cryoborolls/Cryochrepts/ Cryoboralfs
Cirquelands	Granite/gneiss/talus	Cryochrepts

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly livestock grazing, timber harvest, and mining.

M332Eg Anaconda Mountains

Landscape Characteristics: Block faulted mountains that formed in monzonite and granodiorite. Alpine glaciation has altered the landscape. Elevations range from 6,000 to 10,900 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 20 to 30 inches, about 35 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest/Alpine meadow and barren

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ridges	Till/granitics	Cryochrepts/Cryorthents/ Cryoboralfs
Cirquelands	Till/granitics	Cryochrepts

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly livestock grazing, timber harvest, and rural development.

M332Eh Beaverhead Mountains

Landscape Characteristics: Fault block mountains that formed in Belt metasedimentary rocks. These mountains have been modified by alpine glaciation. Elevations range from 6,800 to 10,600 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 20 to 30 inches, about 35 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest/Alpine meadows and barren

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Troughs/terraces/ valley floors	Outwash/alluvium	Cryaquepts/Cryofibrists/ Cryoborolls/Cryochrepts
Mountainsides/ridges/ moraines	Till/quartzite/ argillite	Cryorthents/Cryochrepts/ Cryoborolls/Cryoboralfs
Cirquelands	Till/quartzite	Cryochrepts/Cryorthents

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly livestock grazing, mining, and timber harvest.

M332Ej Southwest Montana Intermontane Basins and Valleys

Landscape Characteristics: Intermontane basins and broad valleys that formed in alluvium, glacial deposits, and Tertiary volcanic materials. Elevations range from 4,700 to 7,600 feet. Drainage density is low.

Climate: Mean annual precipitation ranges from 9 to 20 inches, about 10 percent falling as snow. The soil temperature and moisture regimes are frigid and aridic ustic. Parts of the Red Rock Basin and Big Hole Valley have cryic temperature regimes.

Potential Vegetation: Sagebrush steppe

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Valley floor	Alluvium	Haploborolls/Calciorthids/ Torriorthents/Cryaquolls
Terraces/foothills	Alluvium/till/ volcanic deposits	Cryoborolls/Cryochrepts

Disturbance and Land Use: The primary natural disturbances are flooding and fire. Land use is predominantly livestock grazing, agriculture, and urban/suburban development.

M332Ek Ruby/Tobacco Root Mountains

Landscape Characteristics: Fault block mountains that formed in gneiss, quartzite, granite, shale, sandstone, and limestone. Alpine glaciation has modified much of the landscape. Elevations range from 5,000 to 10,600 feet. Drainage density is moderate to high.

Climate: Mean annual precipitation ranges from 13 to 35 inches, about 60 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest/Alpine meadows and barren

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ridges/ foothills	Till/limestone/shale/ sandstone/gneiss	Cryochrepts/Cryoborolls
Cirquelands	Limestone/gneiss/ granitic materials	Cryochrepts/Cryoborolls

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly timber harvest, livestock grazing, mining, and recreation.

M332En Gravelly/Snowcrest Mountains

Landscape Characteristics: Block faulted mountains that formed in shale, siltstone, sandstone, and a variety of deposited materials. The landscape has been modified by glaciation and mass wasting. Elevations range from 5,800 to 10,600 feet. Drainage density is moderate to high.

Climate: Mean annual precipitation ranges from 14 to 30 inches, about 60 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Western spruce-fir forest/Alpine meadows and barren

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Valley floors/terraces	Alluvium/colluvium/ limestone/shale	Cryoborolls/Cryaquolls/ Cryochrepts
Mountainsides	Till/colluvium/shale/ limestone	Cryoborolls/Cryoboralfs/ Paleboralfs
Alpine ridges/plateaus	Till/colluvium/shale/ limestone	Cryochrepts/Cryoborolls

Disturbance and Land Use: The primary natural disturbances are fire and mass wasting. Land use is predominantly livestock grazing and mining.

M332Ep Blacktail Mountains

Landscape Characteristics: Block faulted mountains that formed in a variety of igneous, metamorphic, and sedimentary rocks. Some higher elevations were glaciated. Elevations range from 6,900 to 8,500 feet. Drainage density is moderate to high.

Climate: Mean annual precipitation ranges from 14 to 20 inches, about 50 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

Potential Vegetation: Douglas-fir forest/Sagebrush steppe

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ridges	Schist/gneiss/ limestone/volcanics	Cryochrepts/Cryoborolls/ Cryoboralfs

Disturbance and Land Use: The primary natural disturbance is fire. Land use is predominantly livestock grazing, timber harvest, and mining.

M332Er Southern Beaverhead Mountains

Landscape Characteristics: Block faulted mountains that formed in a variety of igneous, metamorphic, and sedimentary rocks. Alpine glaciation and mass wasting have altered the landscape. Elevations range from 7,000 to 10,200 feet. Drainage density is low to moderate.

Climate: Mean annual precipitation ranges from 20 to 40 inches, about 50 percent falling as snow. The soil temperature and moisture regimes are cryic and typic ustic.

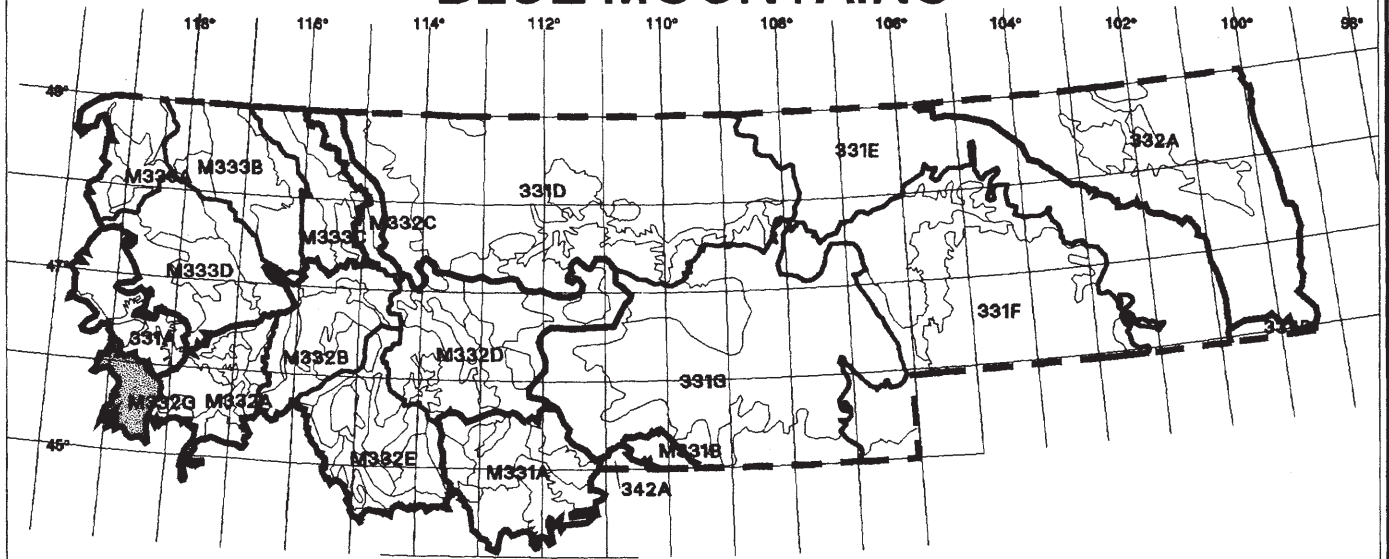
Potential Vegetation: Douglas-fir forest/Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides	Limestone/shale/ volcanics/colluvium	Cryoborolls
Cirquelands	Limestone/shale/ volcanic materials	Cryoborolls/Cryorthents

Disturbance and Land Use: The primary natural disturbances are fire and mass wasting. Land use is predominantly livestock grazing and recreation.

Section M332G BLUE MOUNTAINS



Subsections of Section M332G



M332Gd Snake River Mountains and Canyonlands

Landscape Characteristics: Steep, dissected mountains and stream breaks that formed in basalt, limestone, slate, and minor amounts of granite. Most of the higher elevation lands were glaciated. Elevations range from 1,000 to 9,400 feet. Drainage density is low to moderate.

Climate: Mean annual precipitation ranges from 15 to 45 inches, about 70 percent falling as snow in the higher elevations. The soil temperature and moisture regimes are mesic and typic xeric (cryic and udic at higher elevations).

Potential Vegetation: Western ponderosa forest/Grand fir-Douglas-fir forest/Wheatgrass/bluegrass

Relationships of Dominant Map Unit Components:

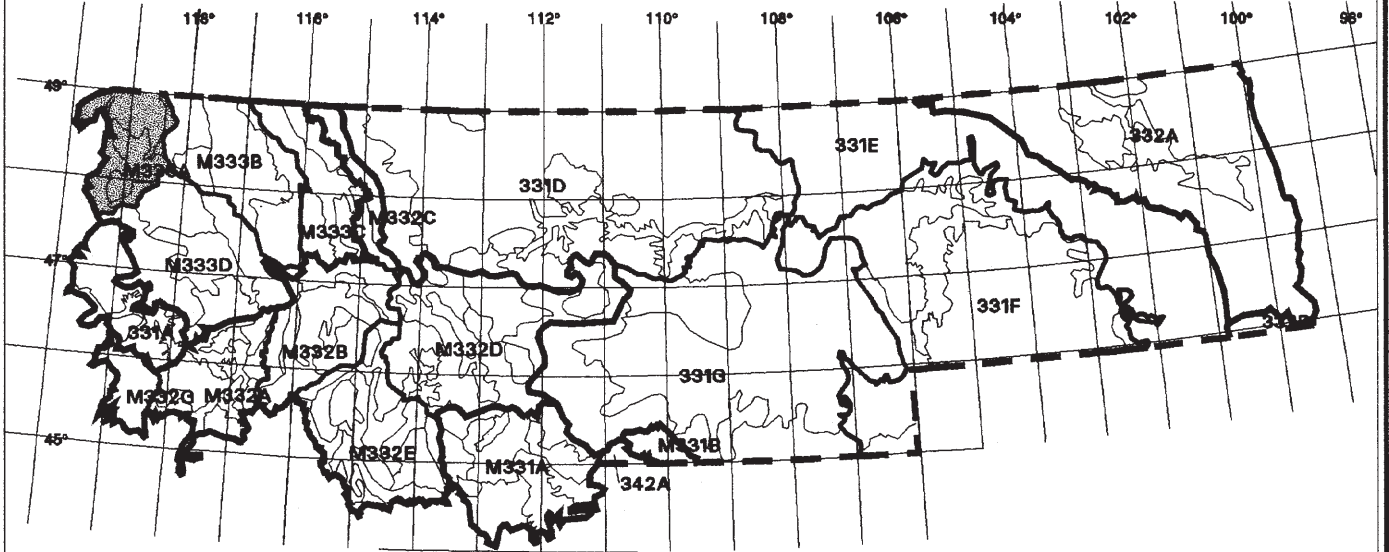
<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Cirqueland/moraines	Till/basalt	Cryochrepts/Cryumbrepts
Mountainsides/breaks	Colluvium/loess/ basalt	Argixerolls/Haploxerolls

Disturbance and Land Use: The primary natural disturbances are fire, insects and disease, and mass wasting. Land use is predominantly livestock grazing, timber harvest, and recreation.

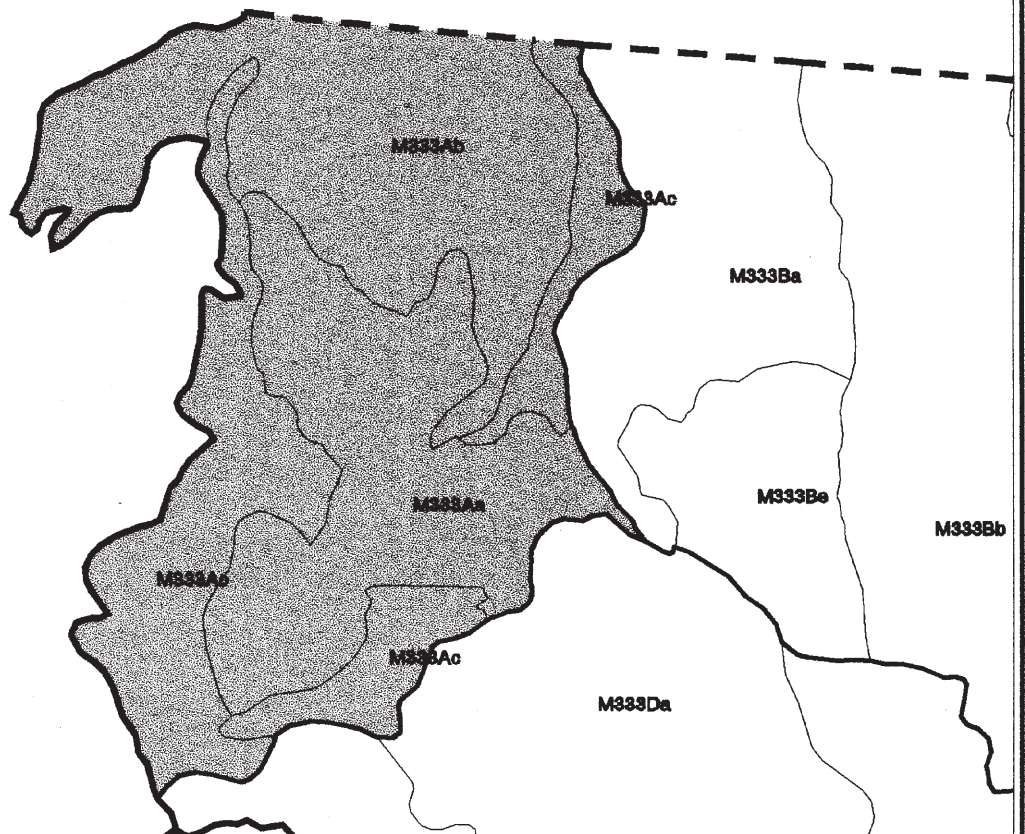


Figure 9—M332Gd - Snake River Mountains and Canyonlands. Seven Devils Mountains.

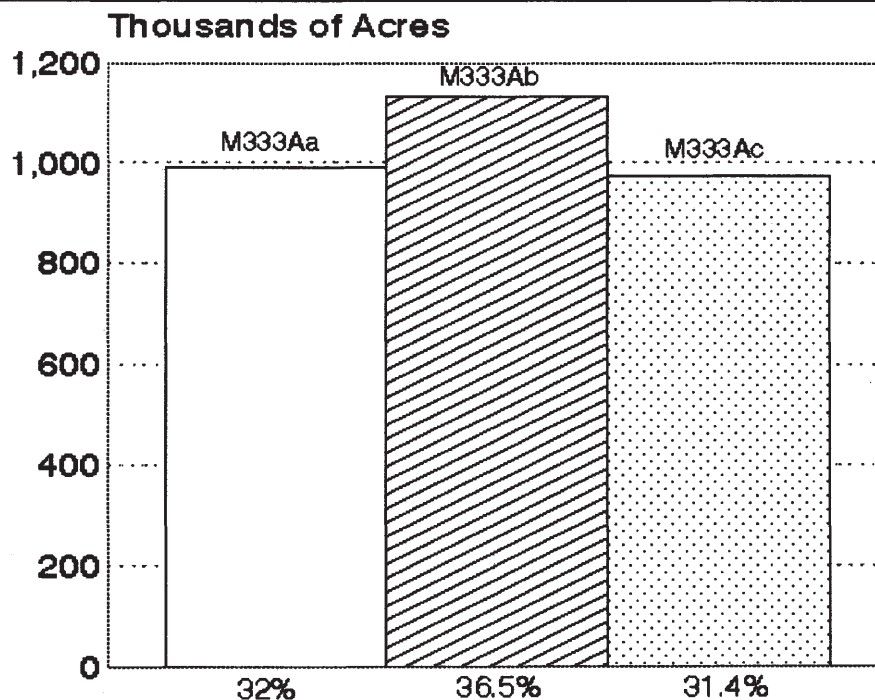
Section M333A OKANOGAN HIGHLANDS



Subsections of Section M333A



Section M333A: Okanogan Highlands Subsection Acreages



M333Aa Pend Oreille/Selkirk Low Mountains and Valleys

Landscape Characteristics: Low mountains, hills, and valleys that formed in quartzite, siltite, argillite, and granitic rocks. Thick layers of volcanic ash form the surface of most soils. Elevations range from 2,100 to 6,300 feet. Drainage density is low to moderate.

Climate: Mean annual precipitation ranges from 25 to 50 inches, about 50 percent falling as snow. The soil temperature and moisture regimes are mesic and typic xeric (cryic and udic at higher elevations). Rain on snow events occasionally occur during the winter months.

Potential Vegetation: Cedar-hemlock-pine forest/Western ponderosa forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Valley floors/fans terraces/toeslopes	Alluvium/outwash	Udivitrands/Aquands
Mountainsides/uplands	Quartzite/siltite/ argillite/granitics	Udivitrands/Dystrochrepts
Mountaintops/ridges	Colluvium/quartzite/ siltite	Haplocryands/Cryochrepts/ Fulvicryands/Cryumbrepts

Disturbance and Land Use: The primary natural disturbance is fire, insects and disease, and mass wasting. Land use is predominantly intensive timber harvest, rural development, and agricultural activities.

M333Ab Selkirk Mountains

Landscape Characteristics: Glaciated mountains that formed in granitic, gneiss, schist, quartzite, argillite, and phyllite rocks. Volcanic ash layers occur on the soil surface over much of the area. Elevations range from 1,800 to 7,700 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 25 to 70 inches, about 50 percent falling as snow. The soil temperature and moisture regimes are cryic and udic (frigid and xeric at lower elevations). Rain on snow events are fairly common.

Potential Vegetation: Cedar-hemlock-pine forest/Douglas-fir forest/Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Valleys/wetlands	Alluvium/till	Aquands/Vitrands/Cryands
Mountainsides/ridges	Till	Udivitrands/Haplocryands/ Cryochrepts/Xerochrepts
Cirquelands	Granitic/gneiss/ schist/till	Cryochrepts/Haplocryands/ Cryumbrepts/Fulvicryands

Disturbance and Land Use: The primary natural disturbances are fire, flooding, insects and disease, and mass wasting. Land use is predominantly intensive timber harvest and livestock grazing.

M333Ac Northern Idaho Valleys

Landscape Characteristics: Wide valleys, outwash plains, and terraces that formed in alluvium, glacial outwash, and lacustrine sediments. Elevations range from 1,400 to 4,000 feet. Drainage density is low to moderate.



Figure 10—M333Ac - Northern Idaho Valleys. Purcell Trench.

Climate: Mean annual precipitation ranges from 15 to 40 inches, about 30 percent falling as snow. The soil temperature and moisture regimes are frigid and typic xeric.

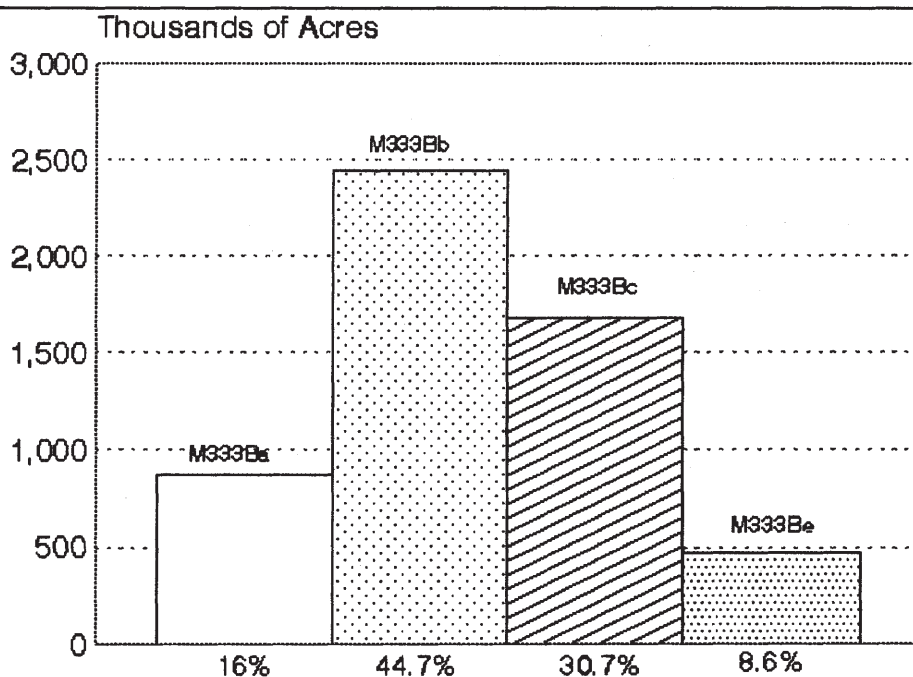
Potential Vegetation: Cedar-hemlock-pine forest/Western ponderosa forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Terraces/outwash plains	Lacustrine sediments/ outwash	Xerochrepts/Haploxeralfs/ Haploxerolls
Floodplains	Alluvium	Haploxerolls/Vitruquands/ Haplaquolls/Fluvaquents

Disturbance and Land Use: The primary natural disturbances are fire and flooding. Land use is predominantly agriculture and urban/suburban development.

Section M333B: Flathead Valley Subsection Acreages



M333Ba Purcell/North Cabinet Mountains

Landscape Characteristics: Glaciated mountains that formed primarily in quartzite, siltite, and argillite. Granitic intrusions also occur. Fairly thick volcanic ash layers occur on most soil surfaces. Elevations range from 1,800 to 7,700 feet. Drainage density is moderate. Lakes are common in this subsection.

Climate: Mean annual precipitation ranges from 25 to 70 inches, about 70 percent falling as snow. The soil temperature and moisture regimes are cryic and udic. Rain on snow events occur frequently.

Potential Vegetation: Douglas-fir forest/Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Valleys/wetlands	Alluvium/till	Umbrepts/Aquands/ Cryands/Fluvents
Mountainsides/ ridges	Till/metasedimentary bedrock	Dystrochrepts/Udivitrands/ Cryochrepts/Haplocryands
Cirquelands	Metasedimentary bedrock/till	Cryochrepts/Haplocryands/ Cryumbrepts/Fulvicryands

Disturbance and Land Use: The primary natural disturbances are fire, insects and disease, and mass wasting. Land use is predominantly intensive timber harvest and livestock grazing.



Figure 11—M333Ba - Purcell/North Cabinet Mountains. Purcell Mountains.

M333Bb Salish Mountains

Landscape Characteristics: Glaciated mountains that formed in argillite, siltite, quartzite, and dolomite. Some volcanic ash layers remain, mostly on ridgetops. Elevations range from 2,500 to 7,600 feet. Drainage density is low to moderate.

Climate: Mean annual precipitation ranges from 20 to 50 inches, about 70 percent falling as snow. The soil temperature and moisture regimes are cryic (frigid at lower elevations) and udic.

Potential Vegetation: Douglas-fir forest/Western ponderosa forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Valley floors	Alluvium/outwash	Eutrochrepts/Cryoboralfs/ Udifluvents
Mountainsides/ moraines	Till/quartzite/ argillite	Cryoboralfs/Cryochrepts/ Eutroborealfs/Eutrochrepts

Disturbance and Land Use: The primary natural disturbances are fire and insect epidemics. Land use is predominantly timber harvest and rural/suburban development.

M333Bc Flathead River Valley

Landscape Characteristics: Intermontane basin that formed in alluvium, glacial outwash, and lacustrine sediments underlain by argillite, siltite, and dolomite. Elevations range from 2,300 to 4,500 feet. Drainage density is low to moderate.

Climate: Mean annual precipitation ranges from 14 to 25 inches, about 50 percent falling as snow. The soil temperature and moisture regimes are frigid and typic xeric.

Potential Vegetation: Foothills prairie/Western ponderosa forest



Figure 12—M333Bc - Flathead River Valley (foreground) with M333Cb - Whitefish/Swan Mountains (background).

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Floodplains/terraces	Alluvium	Haploxerolls/Ustifluvents/ Haploborolls
Foothills/moraines	Lacustrine sediments/ outwash	Xerochrepts/Ustochrepts/ Ustipsamments

Disturbance and Land Use: The primary natural disturbances are fire and flooding. Land use is predominantly agriculture, rural/suburban development, and some timber harvest.

M333Be Cabinet Mountains

Landscape Characteristics: Glaciated mountains that formed in argillite, siltite, quartzite, and dolomite. Volcanic ash deposits occur throughout most of the subsection. Elevations range from 2,100 to 8,700 feet. Drainage density is low to moderate. Lakes occur in some of the cirque basins.

Climate: Mean annual precipitation ranges from 25 to 100 inches, about 70 percent falling as snow. The soil temperature and moisture regimes are cryic and udic.

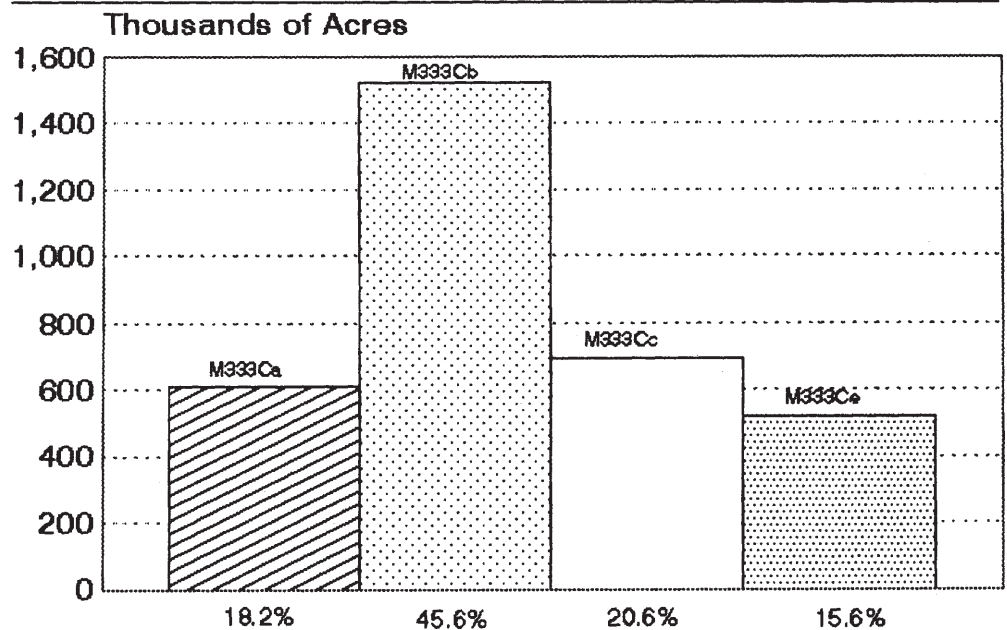
Potential Vegetation: Cedar-hemlock-pine forest/Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/moraines	Till/argillite/ quartzite/dolomite	Cryochrepts/Dystrochrepts
Cirquelands/ridges	Argillite/quartzite/ dolomite	Cryochrepts

Disturbance and Land Use: The primary natural disturbances are fire and insect epidemics. Land use is predominantly timber harvest and recreation.

Section M333C: Northern Rockies Subsection Acreages



M333Ca Livingston Mountains

Landscape Characteristics: Thrust faulted mountains formed from argillite, siltite, and dolomite and strongly shaped by alpine glaciation. Glacial till covers much of the landscape. Volcanic ash deposits also occur. Elevations range from 3,200 to 10,100 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 20 to 110 inches, about 80 percent falling as snow. The soil temperature and moisture regimes are cryic and udic.

Potential Vegetation: Douglas-fir forest and Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides	Till/volcanic ash	Cryoboralfs
Alpine ridges/ cirquelands	Argillite/dolomite/ till	Cryochrepts
Valley floors	Alluvium/outwash	Eutrochrepts/Udifluents/ Cryoboralfs

Disturbance and Land Use: The primary natural disturbances are fire, mass wasting, insects, and windthrow. This subsection is almost entirely within Glacier National Park; therefore, human disturbances are limited.

M333Cb Whitefish/Swan Mountains

Landscape Characteristics: Block faulted mountains that formed from argillite, siltite, and dolomite and strongly shaped by alpine glaciation. Glacial till covers much of the landscape. Some volcanic ash deposits also occur. Elevations range from 2,900 to 8,000 feet. Drainage density is moderate. Lakes occur in glacial cirques and in glacial valleys.

Climate: Mean annual precipitation ranges from 20 to 110 inches, about 80 percent falling as snow. The soil temperature and moisture regimes are cryic and udic.

Potential Vegetation: Douglas-fir forest and Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides	Till/volcanic ash	Cryoboralfs/Eutroborealfs
Alpine ridges/ cirquelands	Argillite/dolomite/ till	Cryochrepts
Valley floors	Alluvium/outwash	Eutrochrepts/Udifluents/ Cryoboralfs

Disturbance and Land Use: The primary natural disturbances are fire, insects, and windthrow. Land use is predominantly rural and suburban development. Some timber harvest also occurs.

M333Cc Mission/Swan Valley and Mountains

Landscape Characteristics: Large intermontane valley with adjacent block faulted mountains that formed in valley fill, till, and metasedimentary rock. Volcanic ash influences most soils. Alpine glaciation has strongly shaped the landscape. Elevations range from 2,900 to 9,300 feet. Drainage density is moderate. Wetlands and lakes occur frequently in this subsection.

Climate: Mean annual precipitation ranges from 20 to 110 inches, about 80 percent falling as snow in the mountains. The soil temperature and moisture regimes are cryic and udic.

Potential Vegetation: Douglas-fir forest and Western spruce-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Valley	Alluvium/outwash/ lacustrine sediments	Eutrochrepts/Cryoboralfs/ Udifluents
Mountainsides	Till/volcanic ash	Cryoboralfs/Eutroborealfs
Alpine ridges/ cirquelands	Argillite/siltite/ dolomite/till	Cryochrepts

Disturbance and Land Use: The primary natural disturbances are fire, insects, and windthrow. Land use is predominantly rural and suburban development and some timber harvest.

M333Ce Flathead Thrust Faulted Mountains

Landscape Characteristics: Thrust faulted mountains that formed from shale, sandstone, limestone, and conglomerate. These mountains have been strongly shaped by alpine glaciation. Elevations range from 3,680 to 8,500 feet. Drainage density is moderate. A few lakes occur in glacial cirque basins.

Climate: Mean annual precipitation ranges from 20 to 90 inches, about 80 percent falling as snow. The soil temperature and moisture regimes are cryic and udic.

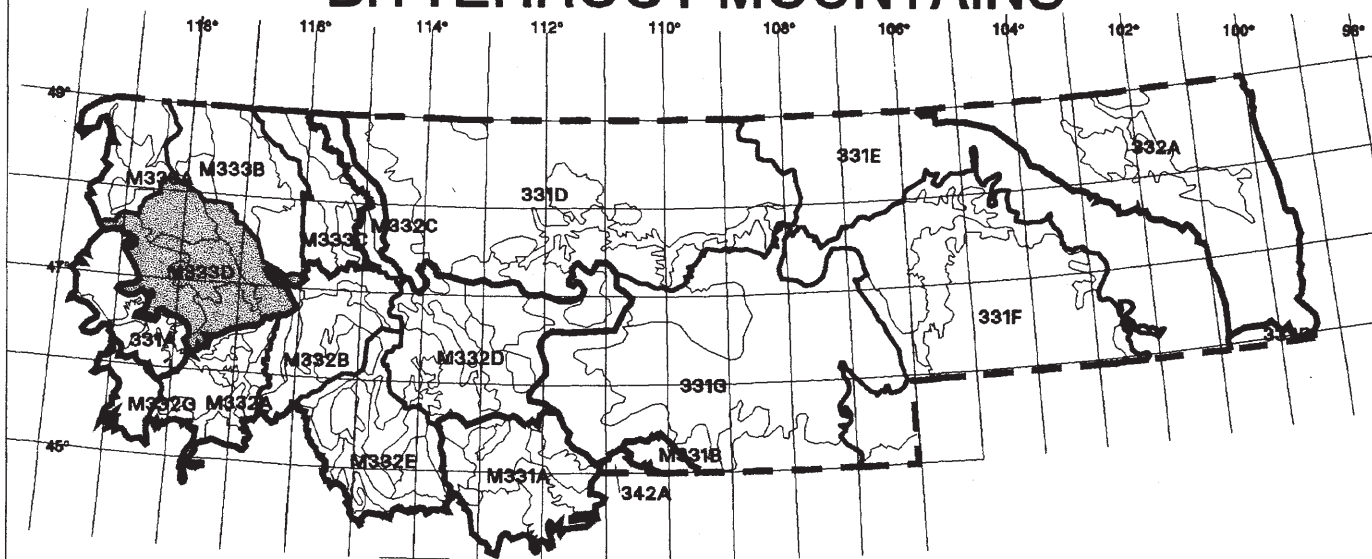
Potential Vegetation: Douglas-fir forest and Western spruce-fir forest

Relationships of Dominant Map Unit Components:

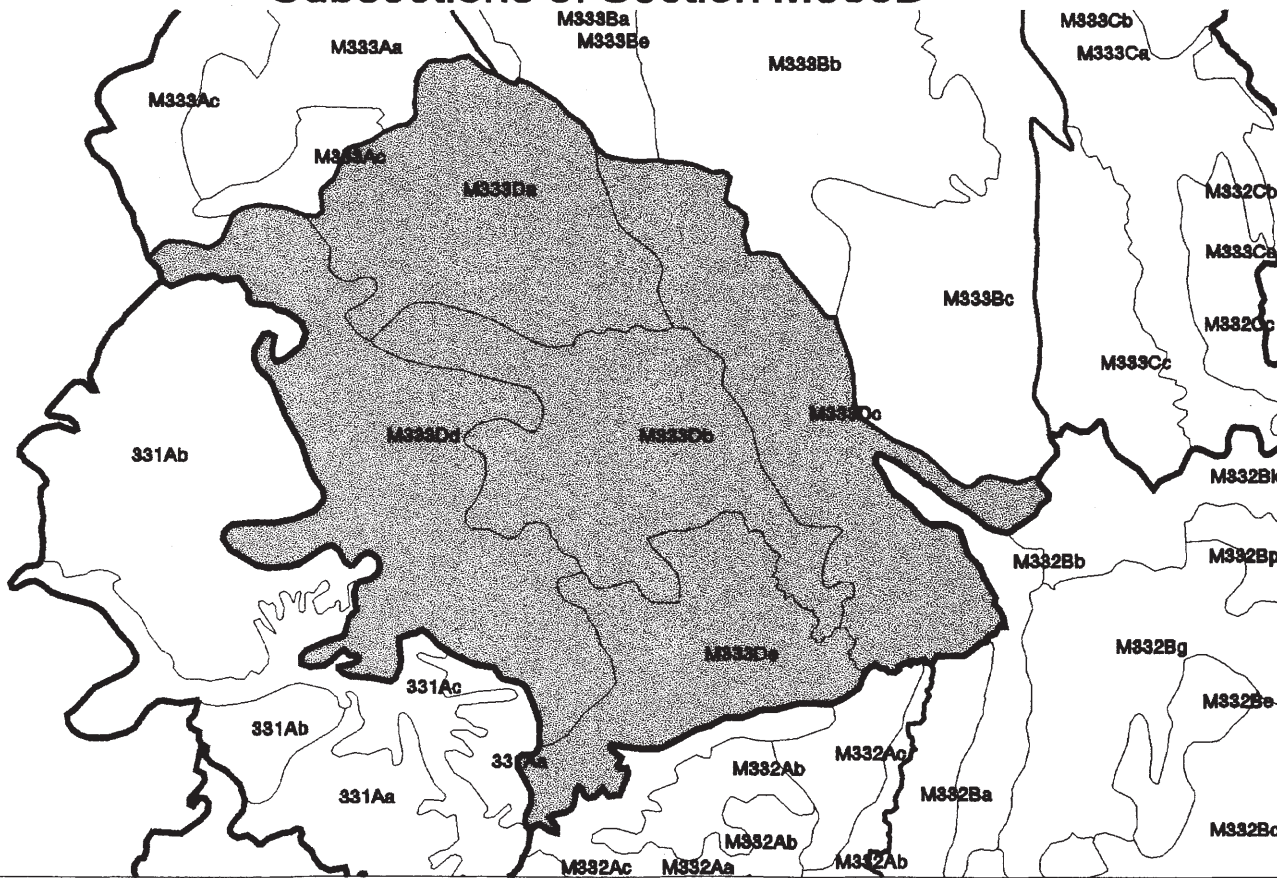
<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides	Till/volcanic ash/ sedimentary rock	Cryoboralfs/Eutroborealfs
Valleys	Alluvium/outwash	Eutrocrepts/Cryoborealfs/ Udofluvents
Alpine ridges/ cirquelands	Sedimentary rock/till	Cryochrepts

Disturbance and Land Use: The primary natural disturbances are fire, insects, and windthrow. This subsection is almost entirely wilderness; therefore, human disturbances are minor.

Section M333D BITTERROOT MOUNTAINS

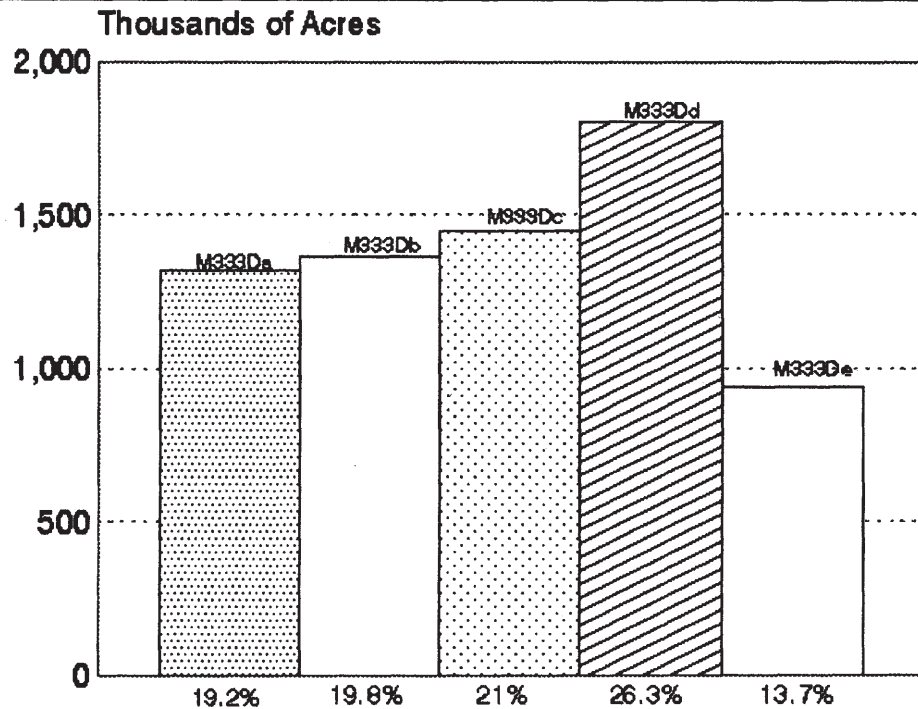


Subsections of Section M333D



Section M333D: Bitterroot Mountains

Subsection Acreages



M333Da Coeur d'Alene Mountains

Landscape Characteristics: Faulted, low relief mountains formed from quartzite, argillite, and siltite. Some basalt occurs on the western edge of the subsection and granitic rocks occur on the east and north sides of Hayden Lake and on the south end of Lake Pend Oreille. Alpine glaciation has shaped the upper one-quarter of most drainages. Volcanic ash influences most surface soils. Elevations range from 2,150 to 6,500 feet. Drainage density is moderate. Hayden, Fernan, Coeur d'Alene, and Pend Oreille lakes occur in or directly adjacent to this subsection. Lakes also occur in a few of the high elevation cirque basins.

Climate: Mean annual precipitation ranges from 20 to 75 inches, about 70 percent falling as snow. The soil temperature and moisture regimes are frigid (cryic at higher elevations) and udic.

Potential Vegetation: Cedar-hemlock-pine forest with some Douglas-fir forest at higher elevations.

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mid-elevation mountain slopes/ridges	Quartzite/siltite/argillite	Udivitrands/Dystrochrepts
High-elevation mountain slopes/ridges/cirques	Quartzite/siltite	Haplocryands/Fulvicryands/Cryochrepts/Dystrochrepts
Valley floors/terraces/fans	Alluvium	Aquands/Cryands/Aquepts/Boralfs

Disturbance and Land Use: The primary natural disturbances are fire, insects, disease, and flooding. Land uses include intensive timber harvest, rural and suburban development, and heavy mining and smelter operations in the Silver Valley.

M333Db St. Joe/Bitterroot Mountains

Landscape Characteristics: Faulted mountains formed from quartzite, siltite, and argillite. Intrusions of granite occur near the Idaho batholith as well as borderzone materials. Elevations range from 2,200 to 7,800 feet. Drainage density is moderate to high.

Climate: Mean annual precipitation ranges from 25 to 80 inches, about 50 percent falling as snow. The soil temperature and moisture regimes are frigid (cryic at higher elevations) and udic. Rain on snow events occur.

Potential Vegetation: Cedar-hemlock-pine forest with Douglas-fir forest at higher elevations.

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides	Metasedimentary	Udivitrands/Cryandepts
Glaciated ridges/slopes/ cirquelands	Metasedimentary	Haplocryands/Fulvicryands
Valley floors/fans/ terraces	Alluvium	Vitrands/Aquands/Aquepts/ Boralfs

Disturbance and Land Use: The primary natural disturbances are fire, insects, disease, and flooding. Land use is predominantly intensive timber harvest and mining.

M333Dc Clark Fork Valley and Mountains

Landscape Characteristics: Mountains formed from quartzite and argillite. Elevations range from 2,300 to 7,500 feet. Drainage density is moderate. Some lakes occur in high elevation cirques.

Climate: Mean annual precipitation ranges from 25 to 80 inches, about 50 percent falling as snow. The soil temperature and moisture regimes are frigid and typic ustic. Some cryic/udic regimes occur at higher elevations.

Potential Vegetation: Western ponderosa forest/Douglas-fir forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides/ridges	Quartzite/argillite	Xerochrepts/Eutrochrepts/ Vitrandepts
Valley floor/fans/ terraces	Alluvium	Xerochrepts/Eutrochrepts/ Vitrandepts

Disturbance and Land Use: The primary natural disturbances are fire, insects, disease, and flooding. Land use is predominantly urban/suburban development, timber harvest, mining, and some grazing.

M333Dd North Idaho Hills and Valleys

Landscape Characteristics: Hills and low relief mountains that formed predominantly from quartzite, argillite, and siltite. Intrusions of Idaho Batholith granitics and Columbia River basalts also occur. Volcanic ash influenced loess covers much of the area. Elevations range from 2,200 to 5,500 feet. Drainage density is moderate to high.

Climate: Mean annual precipitation ranges from 30 to 55 inches, about 60 to 70 percent falling as snow. The soil temperature and moisture regimes are frigid and udic in the east half of the subsection, grading to frigid and typic xeric in the west half. Cryic temperature regimes occur at high elevations.

Potential Vegetation: Cedar-hemlock-pine forest/Western ponderosa forest

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Valley floors/fans/ terraces	Alluvium	Vitrands/Aquands/ Aquepts/Boralfs
Hills/low mountains	Loess	Udivitrands
High elevation slopes/ ridges	Loess	Haplocryands/Fulvicryands

Disturbance and Land Use: The primary natural disturbances are fire, insects, disease, and flooding. Land use is predominantly intensive timber harvest, rural/suburban development, farming/ranching, and mining.

M333De Clearwater Mountains and Breaks

Landscape Characteristics: Low relief mountains and stream breaklands that formed in highly weathered Idaho Batholith granitics. Volcanic ash deposits are common and influence many soils. Elevations range from 2,000 to 6,500 feet. Drainage density is high.

Climate: Mean annual precipitation ranges from 35 to 80 inches, about 40 to 50 percent falling as snow. Rain on snow events are common below 4,500 feet. The soil temperature and moisture regimes are frigid and udic. Some cryic temperatures occur at the higher elevations. This subsection is influenced by a maritime climate.

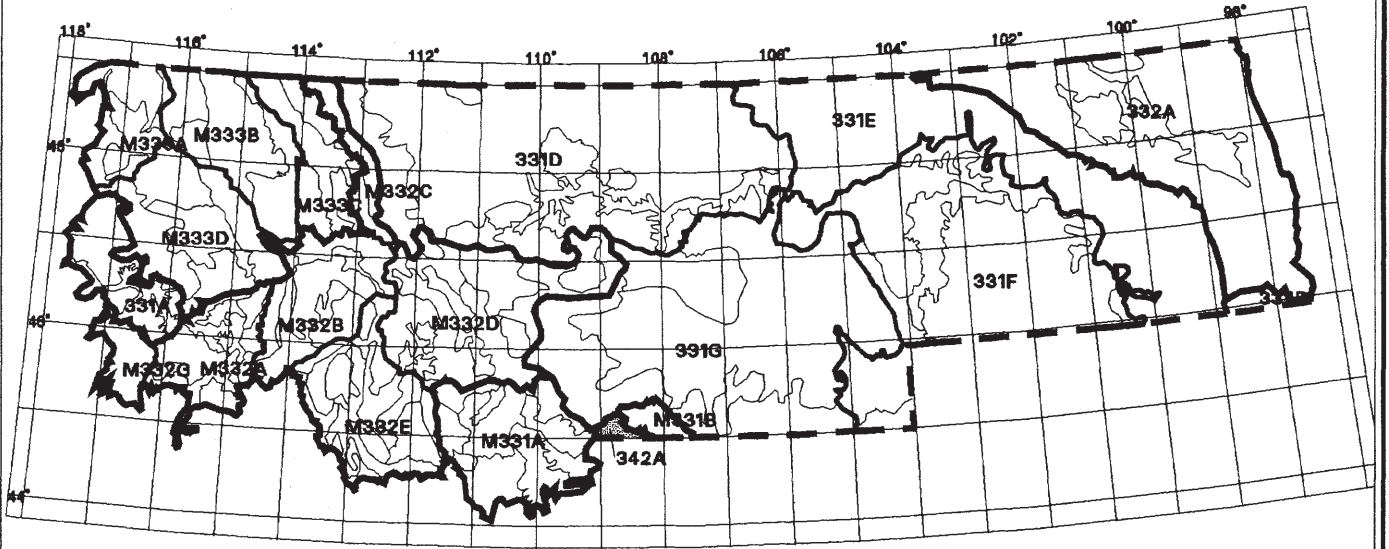
Potential Vegetation: Cedar-hemlock-pine forest with Western spruce-fir forest at higher elevations.

Relationships of Dominant Map Unit Components:

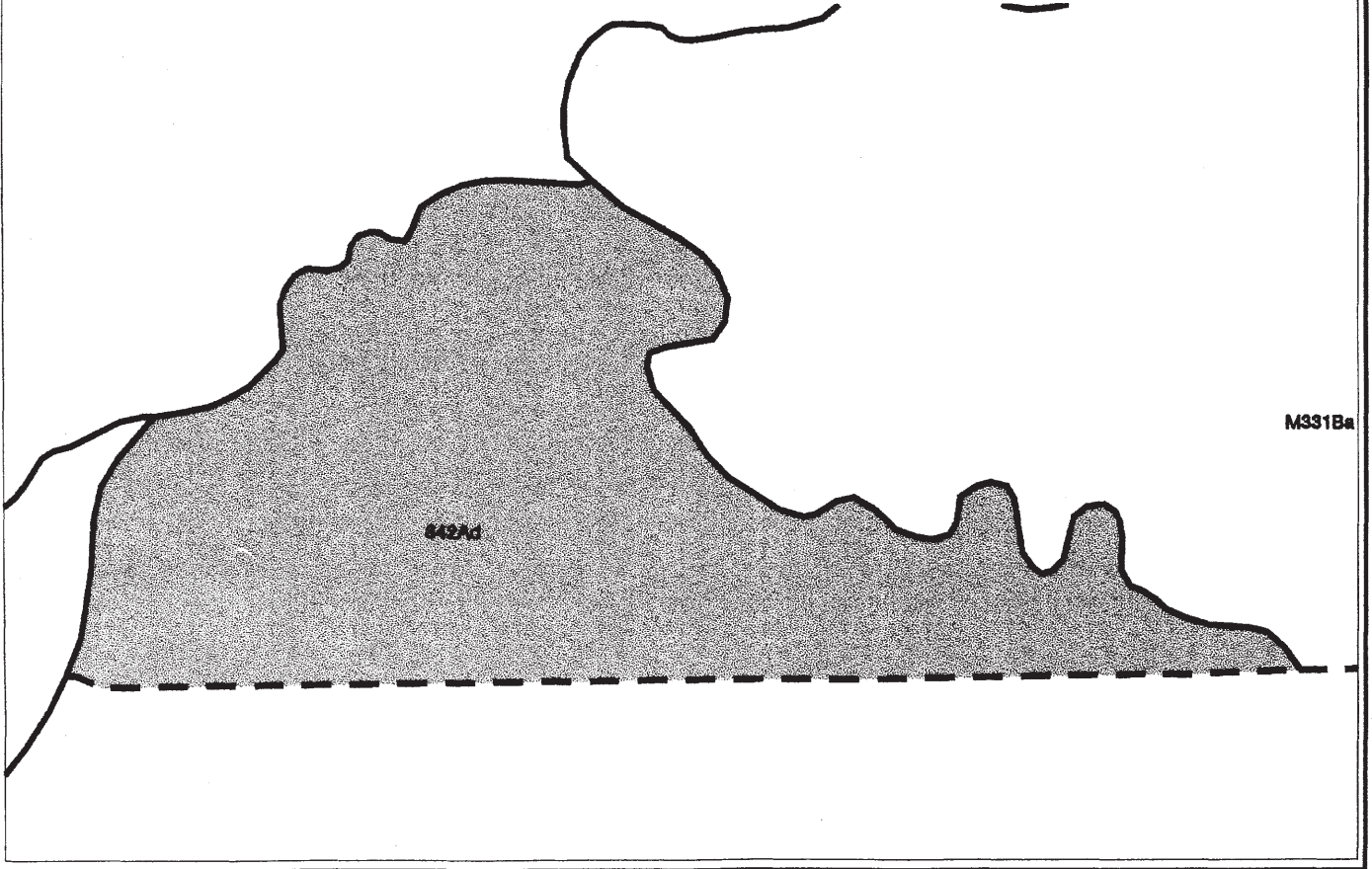
<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Mountainsides	Granite	Fulvicryands/Haplocryands/ Udivitrands
Stream breaks	Granite	Dystrochrepts/Udivitrands
High elevation ridges	Granite	Haplocryands/Cryochrepts

Disturbance and Land Use: The primary natural disturbances are fire, insects, disease, windthrow, and mass wasting. Land use is predominantly timber harvest and related activities.

Section 342A BIGHORN BASIN



Subsections of Section 342A



342Ad Bighorn Intermontane Basin

Landscape Characteristics: Dissected plains, hills, terraces, and fans that formed in shale, siltstone, and sandstone overlain by some alluvium and lacustrine sediment. Elevations range from 3,700 to 4,700 feet. Drainage density is moderate.

Climate: Mean annual precipitation ranges from 5 to 12 inches. The soil temperature and moisture regimes are mesic and ustic aridic. Winters are very dry.

Potential Vegetation: Sagebrush steppe with some Foothills prairie

Relationships of Dominant Map Unit Components:

<u>Landform</u>	<u>Geology</u>	<u>Soil Taxa</u>
Plains/hills	Sedimentary	Torriorthents/Camborthids
Fans/terraces	Alluvium	Camborthids/Calciorthids

Disturbance and Land Use: The primary natural disturbance is drought. Land use is predominantly livestock grazing and irrigated cropland.

Appendix A: Subsection Acres

Subsection	Acres	Number of Polygons	Subsection	Acres	Number of Polygons
331Aa	728,027	2	M332Bk	1,069,316	1
331Ab	1,793,288	2	M332Bp	225,199	1
331Ac	721,942	1	M332Ca	475,328	1
331Da	2,040,563	1	M332Cb	508,740	1
331Db	1,512,751	4	M332Cc	449,506	1
331Dc	488,863	1	M332Da	1,370,953	1
331De	841,265	1	M332Db	1,978,690	2
331Df	1,655,619	1	M332Dc	332,144	1
331Dh	17,925,132	2	M332De	433,262	2
331Ea	15,614,682	1	M332Dg	516,304	1
331Fb	417,135	1	M332Dh	378,384	1
331Fc	2,400,691	1	M332Dj	883,612	1
331Fd	12,210,346	2	M332Dk	2,646,330	1
331Fe	2,136,832	4	M332Dm	170,881	1
331Fg	1,623,611	1	M332Dn	224,838	1
331Ga	3,498,342	1	M332Dp	313,076	1
331Gb	2,411,965	1	M332Ea	672,022	1
331Gc	2,102,060	1	M332Eb	390,737	1
331Gd	581,179	1	M332Ec	176,147	1
331Ge	13,846,942	1	M332Ee	430,626	1
332Aa	12,697,638	1	M332Eg	225,887	1
332Ab	773,695	1	M332Eh	354,714	1
332Ac	1,539,631	1	M332Ej	2,097,837	4
332Ad	799,566	1	M332Ek	412,257	1
332Ae	290,446	1	M332En	809,777	1
332Ba	491,195	1	M332Ep	312,070	1
M331Aa	1,217,591	1	M332Er	410,301	1
M331Af	1,124,175		M332Gd	1,345,904	1
M331Ag	1,041,921	1	M333Aa	992,148	1
M331Ah	693,979	1	M333Ab	1,131,763	1
M331Ai	420,704	1	M333Ac	972,811	3
M331Ak	132,481	1	M333Ba	875,779	1
M331Al	178,628	1	M333Bb	2,443,060	1
M331Am	392,925	1	M333Bc	1,679,192	1
M331Ap	473,663	1	M333Be	468,665	1
M331Ar	524,484	1	M333Ca	610,341	1
M331Ba	660,565	1	M333Cb	1,523,827	1
M332Aa	1,297,211	2	M333Cc	690,014	1
M332Ab	830,336	5	M333Ce	520,599	
M332Ac	1,755,548	4	M333Da	1,321,043	1
M332Ba	450,712	1	M333Db	1,363,689	1
M332Bb	407,651	1	M333Dc	1,444,859	1
M332Bc	729,657	1	M333Dd	1,807,880	1
M332Bd	670,441	1	M333De	940,573	1
M332Be	247,421	1	342Ad	295,845	1
M332Bg	1,185,779	1			

Appendix B: Glossary of Selected Terms

These definitions are from the Glossary of Landforms in the USDA Natural Resources Conservation Service National Soil Survey Handbook and from the American Geological Institute Glossary of Geology.

Alluvium—Unconsolidated clastic material deposited by running water, including gravel, sand, silt, clay, and various mixtures of these.

Cirque—Semicircular, concave, bowl-like area with steep face primarily resulting from erosive activity of a mountain glacier.

Cirqueland—Areas dominated by cirques and related glacial features, rock, and rubbleland.

Colluvium—Unconsolidated, unsorted earth material being transported or deposited on sideslopes and/or at the base of slopes by mass movement (for example, direct gravitational action) and by local, unconcentrated runoff.

Ecological unit—A mapped landscape unit designed to meet management objectives, comprised of one or more ecological types.

Floodplain—The nearly level plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of streams.

Fluvial—Of or pertaining to rivers; produced by river action.

Intermontane basin—A generic term for wide structural depressions between mountain ranges that are partly filled with alluvium and called “valleys” in the vernacular. Intermontane basins may be drained internally (bolsons) or externally (semi-bolson).

Lacustrine deposit—Clastic sediments and chemical precipitates deposited in lakes.

Landscape—A collection or related, natural landforms; usually the land surface which the eye can comprehend in a single view.

Loess—Fine-grained, wind-deposited material, dominantly of silt size.

Metasediment—A sediment or sedimentary rock that shows evidence of having been subjected to metamorphism.

Moraine—A mound, ridge, or other distinct accumulation of unsorted, unstratified glacial drift, predominantly till, deposited chiefly by direct action of glacier ice, in a variety of topographic landforms that are independent of control by the surface on which the drift lies.

Outwash—Stratified detritus (chiefly sand and gravel) removed or “washed out” from a glacier by melt-water streams and deposited in front of or beyond the end moraine or the margin of an active glacier.

Potential vegetation—The biotic community that would be established if all successional sequences of its ecosystem were completed without additional human-caused disturbance under present environmental conditions.

Residuum—Unconsolidated, weathered or partly weathered mineral material that accumulates by disintegration of bedrock in place.

Section—An ecological unit in the subregion planning and analysis scale of the National Hierarchical Framework corresponding to subdivisions of a Province having broad areas of similar geomorphic process, stratigraphy, geologic origin, drainage networks, topography, and regional climate. Such areas are often inferred by relating geologic maps to potential natural vegetation groupings as mapped by Kuchler (1964).

Soil great group—A category of soil classification where soils are placed together based on close similarities in kind, arrangement, and degree of expression of horizons; close similarities in soil moisture and temperature regimes; and similarities in base status.

Soil moisture regime—Classes of soil moisture that are based on the assumption that the soil supports whatever vegetation it is capable of supporting. Moisture regimes are defined in terms of the ground-water level and in terms of the presence or absence of water held at a tension of <15 bars in the moisture control section by periods of the year.

Soil temperature regime—The characteristic temperature regime of a soil that is described by the mean annual soil temperature, the average seasonal fluctuations from that mean, and the mean warm or cold seasonal soil temperature gradient within the main root zone, which is the zone from a depth of 5 to 100 cm.

Subsection—An ecological unit in the subregion planning and analysis scale of the National Hierarchical Framework corresponding to subdivisions of a Section into areas with similar surficial geology, lithology, geomorphic process, soil great groups, subregional climate, and potential vegetation.

Till—Dominantly unsorted and unstratified drift, deposited by a glacier, and consisting of a heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders.

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The maps that accompany this publication are also available on the Forest Service Northern Region internet Web Site at the following address:

www.fs.fed.us/r1/distribution

The following information and maps are available:

SSubsection_README.Hpg1
Subsections for the Northern Region at 1:3,500,000
Subsections with colored relief background at 1:3,500,000
Subsections for Montana at 1:1,000,000
Subsections for northern Idaho at 1:1,000,000
Subsections for North Dakota at 1:1,000,000

Nesser, John A.; Ford, Gary L.; Maynard, C. Lee; Page-Dumroese, Deborah S. 1997. Ecological units of the Northern Region: subsections. Gen. Tech. Rep. INT-GTR-369. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 88 p.

Ecological units are described at the subsection level of the Forest Service National Hierarchical Framework of Ecological Units. A total of 91 subsections are delineated on the 1996 map "Ecological Units of the Northern Region: Subsections," based on physical and biological criteria. This document consists of descriptions of the climate, geomorphology, geology, vegetation, and soils that characterize each subsection. Included is information on sources of natural disturbances, current land use, and ecological relationships of the major components.

Keywords: ecosystems, physical features, biological characteristics, map unit descriptions



The Intermountain Research Station provides scientific knowledge and technology to improve management, protection, and use of the forests and rangelands of the Intermountain West. Research is designed to meet the needs of National Forest managers, Federal and State agencies, industry, academic institutions, public and private organizations, and individuals. Results of research are made available through publications, symposia, workshops, training sessions, and personal contacts.

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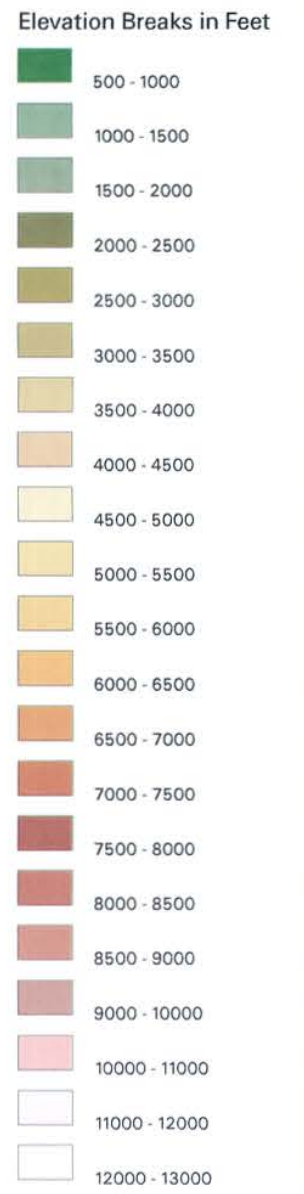
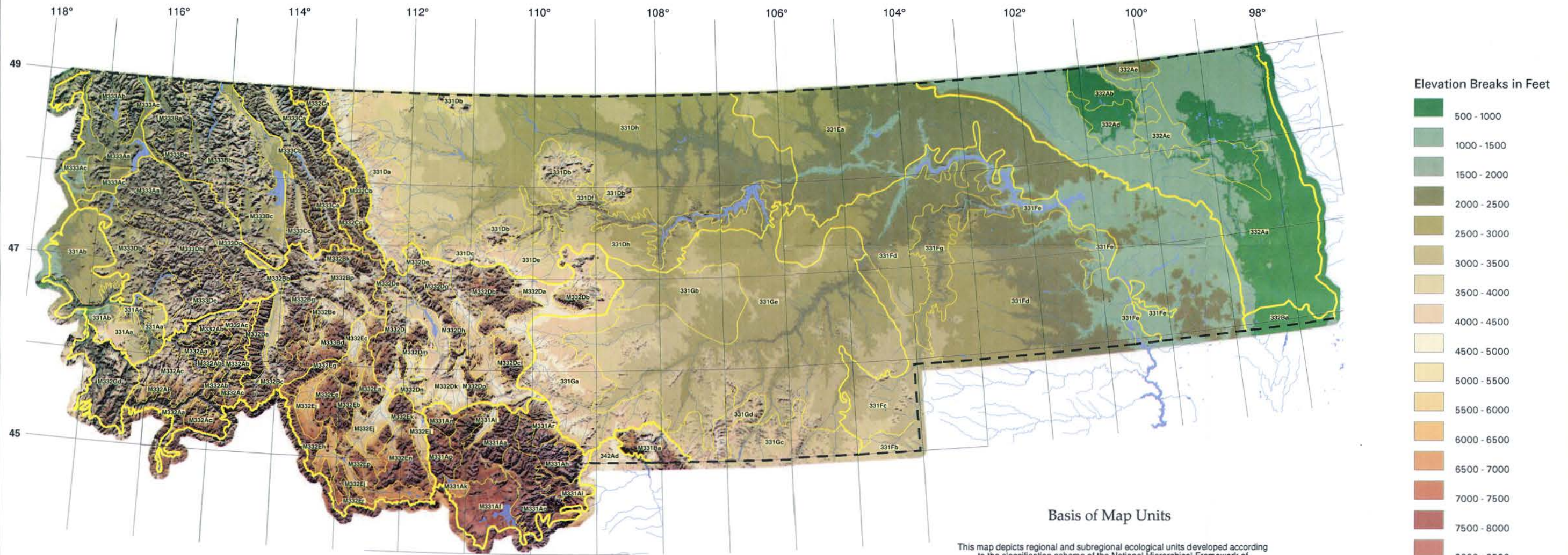
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Ecological Units Of The Northern Region

Colored Relief, Sections and Subsections

Montana, Northern Idaho and North Dakota

1996: First Approximation



Basis of Map Units

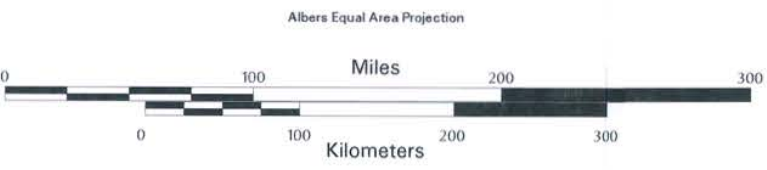
This map depicts regional and subregional ecological units developed according to the classification scheme of the National Hierarchical Framework of Ecological Units (Avers et al., 1994). The map presents the first iteration of Subsections which nest within and refine successively larger ecological units (Bailey, et al., 1994).

Ecological units are identified at all hierarchical levels by the integration of physical and biological components of the environment which include climate, geomorphology, geology, soils, hydrology, and vegetation. All components are considered and evaluated in the placement of boundaries, but their importance varies with scale.

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The colored shaded relief background was generated from USGS 250k DEMs. The DEMs for Montana, Idaho, North Dakota and parts of Wyoming were merged together in Arc/Info. The resulting lattice was sliced, hillshaded, illuminated and then processed into red, green and blue color components following a routine patterned after one created by Jeffery Nighbert of BLM in Portland, OR. The illumination azimuth is 345 degrees from north and 45 degrees above the horizon with a vertical exaggeration of 2.5.

Map Scale: 1:3,500,000



Boundary Lines:

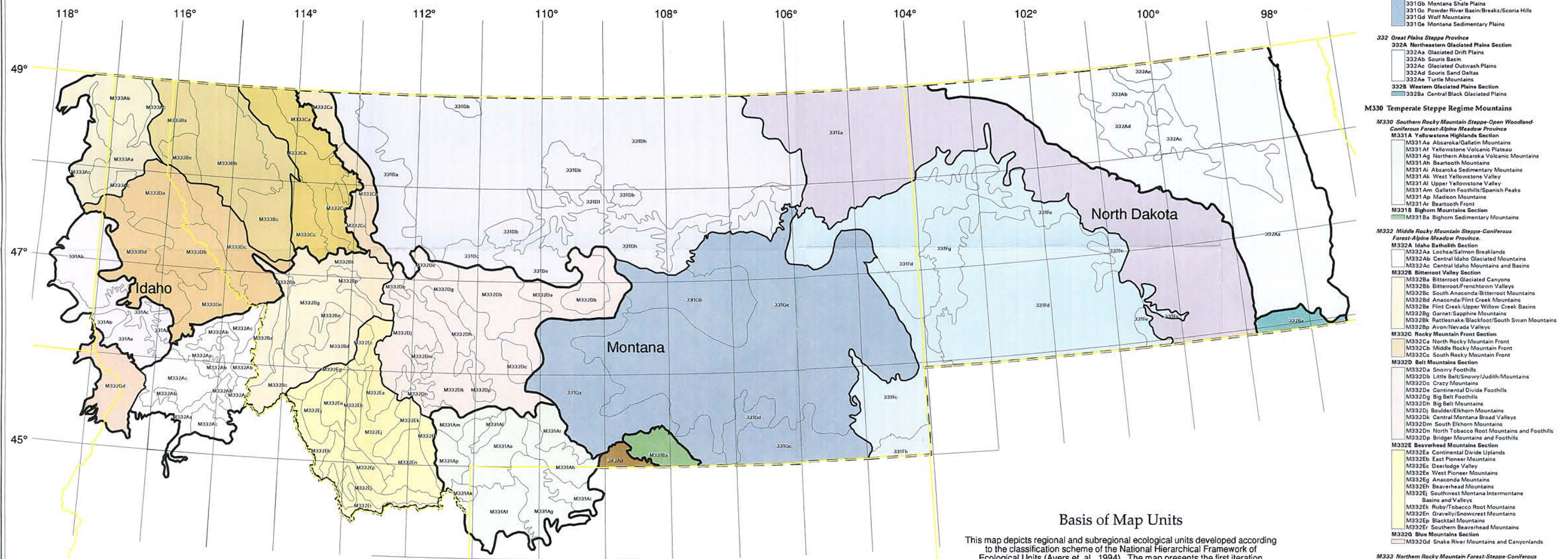
- Subsection
- Section
- - - Study Boundary Not Concurrent with Unit

Compiled and edited by John A. Nesser, Gary L. Ford, C. Lee Maynard, and Deborah S. Page-Dumroese
 USFS Forest Service, Northern Region
 Intermountain Research Station
 Cartographic Production by Duane F. Lund
 Natural Resource Information System
 This GIS product was compiled from various sources and may be corrected, updated, modified, or replaced at any time.
 For more information contact:
 U.S.D.A. Forest Service, Northern Region



Ecological Units Of The Northern Region: Subsections

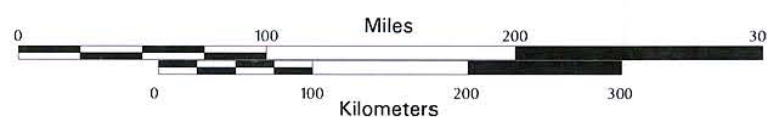
Montana, Northern Idaho and North Dakota First Approximation 1996



- 300 DRY DOMAIN**
- 330 Temperate Steppe Division**
- 331 Great Plains-Palouse Dry Steppe Province**
- 331A Palouse Prairie Section**
- 331Aa Canby/Wetmore Basalt Plateaus
- 331Ab Palouse Hills
- 331Ac Clearwater Canyon Breaks
- 331D Northwestern Glaciated Plains Section**
- 331Da Rocky Mountain Front Foothills
- 331Db Montana Isolated Mountain Ranges
- 331Dc Belt Mountain Foothills
- 331De Little Belt Foothills
- 331Df Missouri River Breaks
- 331Dh Montana Glaciated Plains
- 331E Northern Glaciated Plains Section**
- 331Ea Missouri Coteau
- 331F Northwestern Great Plains Section**
- 331Fb Shale Scablands
- 331Fc Pierre Shale Plains
- 331Fd Missouri Plateau
- 331Fe Missouri Breaks
- 331Fg Little Missouri Badlands
- 331G Powder River Basin Section**
- 331Ga Montana High Plains and Foothills
- 331Gb Montana Shale Plains
- 331Gc Powder River Basin/Breaks/Scoria Hills
- 331Gd Wolf Mountains
- 331Ge Montana Sedimentary Plains
- 332 Great Plains Steppe Province**
- 332A Northeastern Glaciated Plains Section**
- 332Aa Glaciated Drift Plains
- 332Ab Souris Basin
- 332Ac Glaciated Outwash Plains
- 332Ad Souris Sand Deltas
- 332Ae Turtle Mountains
- 332B Western Glaciated Plains Section**
- 332Ba Central Black Glaciated Plains
- M330 Temperate Steppe Regime Mountains**
- M330 Southern Rocky Mountain Steppe-Open Woodland-Caniferous Forest-Alpine Meadow Province**
- M331A Yellowstone Highlands Section**
- M331Aa Absaroka/Gallatin Mountains
- M331Af Yellowstone Volcanic Plateau
- M331Ag Northern Absaroka Volcanic Mountains
- M331Ab Beartooth Mountains
- M331Ai Absaroka Sedimentary Mountains
- M331Ak West Yellowstone Valley
- M331Al Upper Yellowstone Valley
- M331Am Gallatin Foothills/Spanish Peaks
- M331Ap Madison Mountains
- M331Ar Beartooth Front
- M331B Bighorn Mountains Section**
- M331Ba Bighorn Sedimentary Mountains
- M332 Middle Rocky Mountain Steppe-Caniferous Forest-Alpine Meadow Province**
- M332A Idaho Batholith Section**
- M332Aa Lochsa/Salmon Breaklands
- M332Ab Central Idaho Glaciated Mountains
- M332Ac Central Idaho Glaciated Mountains and Basins
- M332B Bitterroot Valley Section**
- M332Ba Bitterroot Glaciated Canyons
- M332Bb Bitterroot/Frenchtown Valleys
- M332Bc South Anacoda/Bitterroot Mountains
- M332Bd Anacoda/Fint Creek Mountains
- M332Be First Creek/Upper Willow Creek Basins
- M332Bf Garnet/Sapphire Mountains
- M332Bk Rattlesnake/Blackfoot/South Swan Mountains
- M332Bp Arvon/Nevada Valleys
- M332C Rocky Mountain Front Section**
- M332Ca North Rocky Mountain Front
- M332Cb Middle Rocky Mountain Front
- M332Cc South Rocky Mountain Front
- M332D Belt Mountains Section**
- M332Dd Snowy Foothills
- M332Db Little Belt/Snowy/Judith Mountains
- M332Dc Crazy Mountains
- M332De Continental Divide Foothills
- M332Dg Big Belt Foothills
- M332Dh Big Belt Mountains
- M332Dj Boulder/Elkhorn Mountains
- M332Dk Central Montana Broad Valleys
- M332Dm South Elkhorn Mountains
- M332Dn North Tobacco Root Mountains and Foothills
- M332Dp Bridger Mountains and Foothills
- M332E Beaverhead Mountains Section**
- M332Ea Continental Divide Uplands
- M332Eb East Pioneer Mountains
- M332Ec Deerlodge Valley
- M332Ed West Pioneer Mountains
- M332Eg Anacoda Mountains
- M332Eh Beaverhead Mountains
- M332Ej Southwest Montana Intermontane Basins and Valleys
- M332Ek Ruby/Tobacco Root Mountains
- M332En Gravelly/Snowcrest Mountains
- M332Ep Blacktail Mountains
- M332Er Southern Beaverhead Mountains
- M332F Blue Mountains Section**
- M332Fd Snake River Mountains and Canyonlands
- M333 Northern Rocky Mountain Forest-Steppe-Caniferous Forest-Alpine Meadow Province**
- M333A Okanogan Highlands Section**
- M333Aa Pend Oreille/Selkirk Low Mountains and Valleys
- M333Ab Selkirk Mountains
- M333Ac Northern Idaho Valleys
- M333B Flathead Valley Section**
- M333Ba Puseall/North Cabinet Mountains
- M333Bb Salish Mountains
- M333Bc Flathead River Valley
- M333Bd Cabinet Mountains
- M333C Northern Rockies Section**
- M333Ca Livingston Mountains
- M333Cb Whitefish/Swan Mountains
- M333Cc Mission/Swan Valley and Mountains
- M333Cc Flathead Thrust Faulted Mountains
- M333D Bitterroot Mountains Section**
- M333Da Coeur d'Alene Mountains
- M333Db St. Joe/Bitterroot Mountains
- M333Dc Clark Fork Valley and Mountains
- M333Dd North Idaho Hills and Valleys
- M333De Clearwater Mountains and Breaks
- 340 Temperate Desert Division**
- 342 Intermountain Semi-Desert Province**
- 342A Bighorn Basin Section**
- 342Ad Bighorn Intermontane Basin

Map Scale: 1:3,500,000

Albers Equal Area Projection



Legend:

- Subsection
- Section
- Province
- - - Study Boundary Not Concurrent with Unit
- State Borders

Basis of Map Units

This map depicts regional and subregional ecological units developed according to the classification scheme of the National Hierarchical Framework of Ecological Units (Avers et al., 1994). The map presents the first iteration of Subsections which nest within and refine successively larger ecological units (Bailey, et al., 1994).

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