DRAFT 2 Ecoregions of Montana

Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources; they are designed to serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components. By recognizing the spatial differences in the capacities and potentials of ecosystems, ecoregions stratify the environment by its probable response to disturbance (Bryce and others, 1999). These general purpose regions are critical for structuring and implementing ecosystem management strategies across federal agencies, state agencies, and nongovernment organizations that are responsible for different types of resources within the same geographical areas (Omernik and others, 2000).

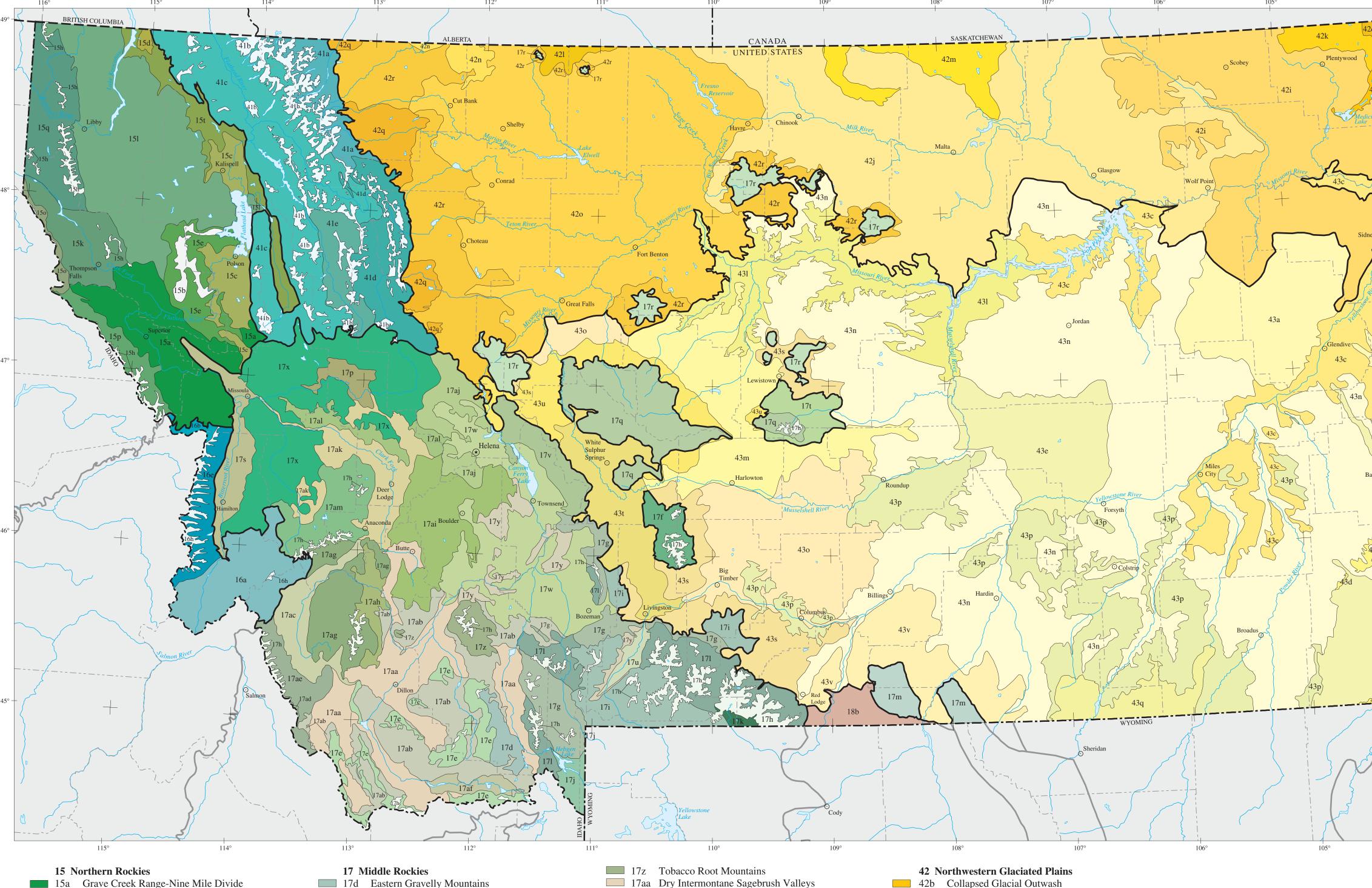
The approach used to compile this map is based on the premise that ecological regions can be identified through the analysis of the spatial patterns and the composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity (Wiken, 1986; Omernik, 1987, 1995). These phenomena include geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology.

The relative importance of each characteristic varies from one ecological region to another regardless of the hierarchical level. A Roman numeral hierarchical scheme has been adopted for different levels of ecological regions. Level I is the coarsest level, dividing North America into 15 ecological regions. Level II divides the continent into 52 regions (Commission for Environmental Cooperation Working Group, 1997). At level III, the continental United States contains 104 ecoregions and the conterminous United States has 84 ecoregions (United States Environmental Protection Agency (USEPA), 2000). Level IV is a further subdivision of level III ecoregions. Explanations of the methods used to define the USEPA's ecoregions are given in Omernik (1995), Omernik and others (2000), and Griffith and others (1989, 1994). The second edition of "Ecoregions of Montana" revises many ecoregion polygon assignments that appeared in the first edition (Woods and others, 1999). These changes were made after research in Idaho (McGrath and others, 2002) recognized the Idaho Batholith as a separate level III ecoregion (Ecoregion 16), limited the Northern Rockies (15) to strongly marine-influenced areas, and transferred the Montana Valley

and Foothill Prairies (formerly Ecoregion 16) to another level III ecoregion, the Middle Rockies (17). The second edition also modifies a few level IV ecoregion lines along Montana's western border so that ecoregions shared by Montana and Idaho will edge match. In addition, it updates ecoregion names so that they are consistent with the most recent ecoregion work in area (Chapman and others, 2003). However, it is important to note that although many polygon assignments and a few ecoregion names have changed between the first and second editions, nearly all level IV ecoregion line positions are identical on the two editions.

The level III and IV ecoregion map on this poster was compiled at a scale of 1:250,000 and depicts revisions and subdivisions of earlier level III ecoregions that were originally compiled at a smaller scale (USEPA, 2000; Omernik, 1987). This poster is part of a collaborative project primarily between USEPA Region VIII, USEPA National Health and Environmental Effects Research Laboratory (Corvallis, Oregon), Montana Department of Environmental Quality (MDEQ), United States Department of Agriculture-Forest Service, United States Department of Agriculture-Natural Resources Conservation Service (formerly Soil Conservation Service), United States Department of the Interior-Bureau of Land Management, and United States Department of the Interior-U.S. Geological Survey-Earth Resources Observation Systems (EROS) Data Center.

frameworks for the entire nation.



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St. Joe Schist-Gneiss Zone Purcell-Cabinet-North Bitterroot Mountains 15t Stillwater-Swan Wooded Valley 16 Idaho Batholith **16**a Eastern Batholith

Camas Valley

Flathead Valley

Tobacco Plains

Salish Mountains

Flathead Hills and Mountains

Clearwater Mountains and Breaks

Clark Fork Valley and Mountains

Coeur d' Alene Metasedimentary Zone

High Northern Rockies

16b Lochsa Uplands

16 Glaciated Bitterroot Mountains and Canyons 16h High Idaho Batholith

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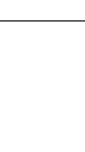
Eastern Gravelly Mountains

- Barren Mountains Crazy Mountains
- **Mid-Elevation Sedimentary Mountains**
- Alpine Zone Absaroka-Gallatin Volcanic Mountains
- Yellowstone Plateau
- Granitic Subalpine Zone
- **Gneissic-Schistose Forested Mountains**
- Dry Mid-Elevation Sedimentary Mountains oothill Potholes
- Big Snowy-Little Belt Carbonate Mountains
- Scattered Eastern Igneous-Core Mountains Bitterroot-Frenchtown Valley
- Limy Foothill Savanna
- Paradise Valley **Big Belt Forested Highlands**
- Townsend Basin
- Rattlesnake-Blackfoot-South Swan-Northern Garnet-Sapphire Mountains
- 17y Townsend-Horseshoe-London Sedimentary









The project is associated with an interagency effort to develop a common framework of ecological regions. Reaching that objective requires recognition of the differences in the conceptual approaches and mapping methodologies applied to develop the most common ecoregion-type frameworks, including those developed by the U.S. Forest Service (Bailey and others, 1994), the USEPA (Omernik, 1987, 1995), and the Natural Resources Conservation Service (U.S. Department of Agriculture–Soil Conservation Service, 1981). As each of these frameworks is further refined, their differences are becoming less discernible. Regional collaborative projects such as this one in Montana, where agreement has been reached among multiple resource management agencies, are a step toward attaining consensus and consistency in ecoregion

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	110		
	17z	Tobacco Root Mountains	
	17aa	Dry Intermontane Sagebrush Valleys	
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- 17ab Dry Gneissic-Schistose-Volcanic Hills 17ac Big Hole
- 17ad Western Beaverhead Mountains **17**ae Forested Beaverhead Mountains
- 17af Centennial Basin
- 17ag Pioneer-Anaconda Ranges
- 17ah Eastern Pioneer Sedimentary Mountains 17ai Elkhorn Mountains-Boulder Batholith
- **17**aj Eastern Divide Mountains 17ak Deer Lodge-Philipsburg-Avon Grassy
 - Intermontane Hills and Valleys
- 17al Southern Garnet Sedimentary-Volcanic Mountains 17am Flint Creek-Anaconda Mountains
 - 18 Wyoming Basin
- 18b Bighorn Basin 41 Canadian Rockies
- 41a Northern Front
- 41b Crestal Alpine-Subalpine Zone 41c Western Canadian Rockies
- 41d Southern Carbonate Front 41e Flathead Thrust Faulted Carbonate-Rich
 - Mountains
- 57 Huron/Erie Lake Plains 58 Northeastern Highlands 59 Northeastern Coastal Zone 60 Northern Appalachian Plateau and Uplands 61 Erie Drift Plain 62 North Central Appalachian 63 Middle Atlantic Coastal Plain 64 Northern Piedmont 65 Southeastern Plains 66 Blue Ridge 67 Ridge and Valley 8 Southwestern Appalachian 9 Central Appalachians 70 Western Allegheny Plateau 1 Interior Plateau 2 Interior River Valleys and Hill 73 Mississippi Alluvial Plain 74 Mississippi Valley Loess Plai Southern Coastal Plain 5 Southern Florida Coastal Plai North Cascades 78 Klamath Mountains 79 Madrean Archipelago 80 Northern Basin and Range 81 Sonoran Basin and Range 2 Laurentian Plains and Hills 83 Eastern Great Lakes and Hudson Lowlands 84 Atlantic Coastal Pine Barrens

4 3q	Mesic Dissected Plains	
43 s	Non-calcareous Foothill Grassland	
43t	Shield-Smith Valleys	
43 u	Limy Foothill Grassland	
43v	Pryor-Big Horn Foothills	
Forest Service), James	RS: Alan J. Woods (Dynamac Corporation), James M. Omernik (USEPA), John A. Nesser (U.S. Shelden (U.S. Forest Service), Comstock, Jeffrey A. (Indus Corporation), and Sandra H. Azevedo	
COLLABORATORS AND CONTRIBUTORS: Robert Bukantis (Montana Department of Environmental Quality), Chuck Gordon (Natural Resources Conservation Service), Bill Volk (Bureau of Land Management), Loren Bahls (Flathead Lake Biological Station, University of Montana), Dan Svoboda (USFS), Wease A. Bollman (Rhithron Biological Associates, Missoula, Montana), Thomas R. Loveland (U.S. Geological Survey), Anthony Selle (USEPA),		
Alisa Gallant (Raytheon STX Corporation, Science Applications Branch, U.S. Geological Survey-Earth Resources Observation Systems (EROS) Data Center), Cliff Montagne (Land Resources and Environmental Science, Montana State University), and John Donahue (Department of Geography, University of Montana)		
	R: Woods, Alan J., Omernik, James, M., Nesser, John A., Shelden, J., Comstock, J.A., Azevedo, regions of Montana, 2nd edition (color poster with map, descriptive text, summary tables, and	

This project was partially supported by funds from the Environmental Protection Agency's Office of Research and Development, Regional Applied Research Effort (RARE) program.





photographs). Map scale 1:1,500,000.

42d Northern Missouri Coteau

42k Coteau Lakes Upland

42m Cherry Patch Moraines

42n Milk River Pothole Upland

43 Northwestern Great Plains

420 North Central Brown Glaciated Plains

42q Rocky Mountain Front Foothill Potholes

421 Sweetgrass Uplands

42r Foothill Grassland

43a Missouri Plateau

43c River Breaks

43d Forested Buttes

43e Sagebrush Steppe

43k Dense Clay Prairie

43p Pine Scoria Hills

43m Judith Basin Grassland

43b Little Missouri Badlands

43g Semiarid Pierre Shale Plains

43n Montana Central Grasslands

430 Unglaciated Montana High Plains

431 Missouri Breaks Woodland-Scrubland

42i Glaciated Dark Brown Prairie

42j Glaciated Northern Grasslands



15 10 5 0

30 20 10 0

Level III ecoregion

— Level IV ecoregion

— — — – International boundary

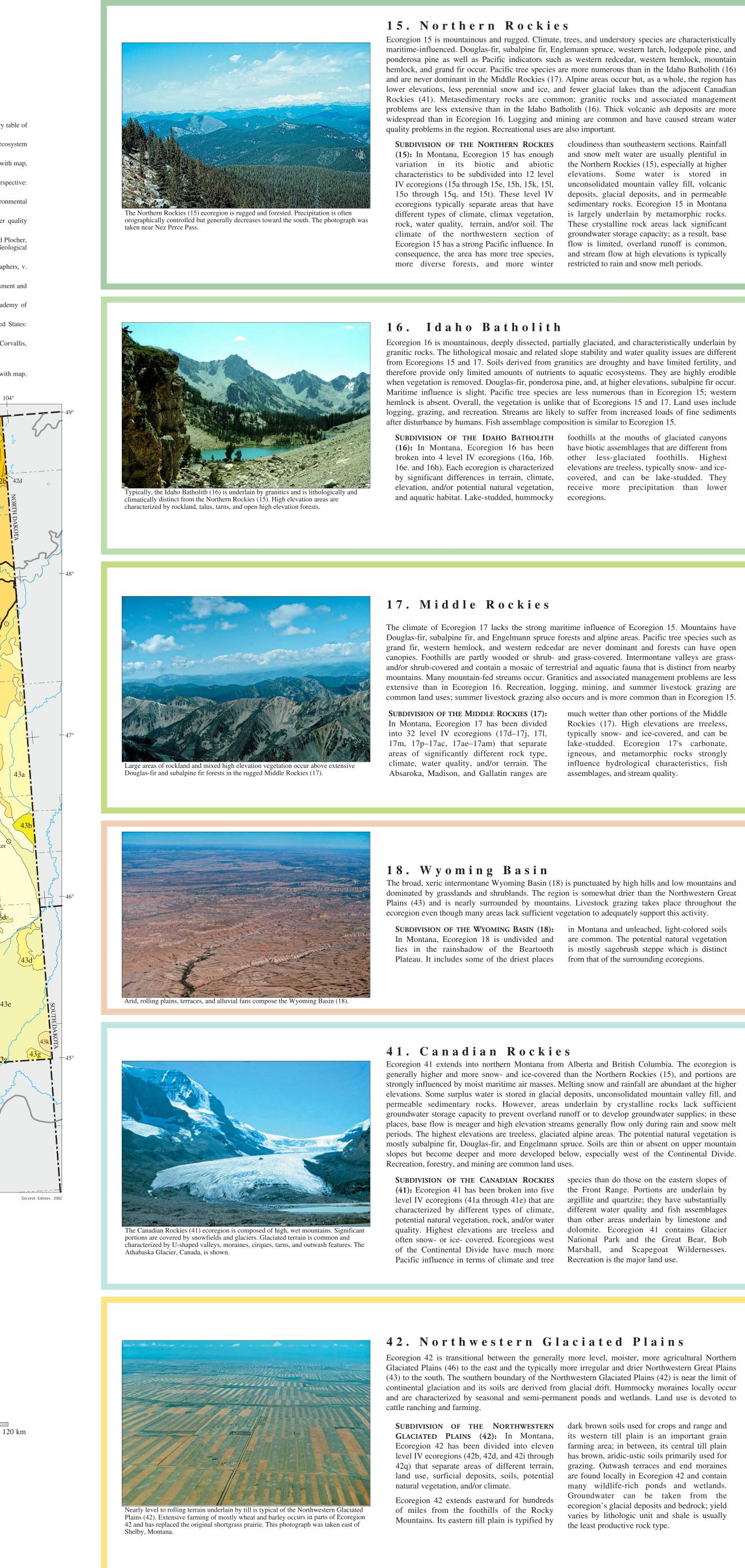
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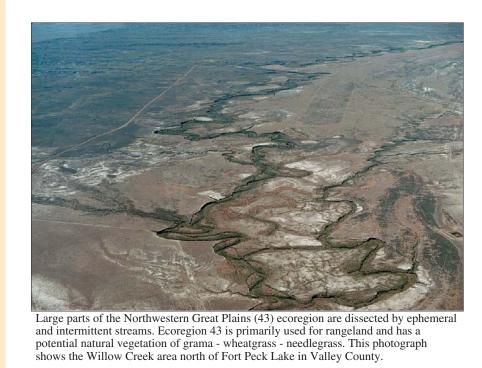
Albers equal area projection

Standard parallels 46° N and 48° N

---- County boundary

————— State boundary





43. Northwestern Great Plains Ecoregion 43 is largely an unglaciated, semiarid, and rolling plain that is underlain by shale, siltstone. and sandstone. It contains occasional buttes, badlands, ephemeral-intermittent streams, and a few perennial rivers. Low precipitation and high summer evapotranspiration rates restrict groundwater recharge rates. Rangeland is common, but spring wheat and alfalfa farming also occur; agriculture is

especially in areas of steep or broken topography. SUBDIVISION OF THE NORTHWESTERN buttes occur locally and can be covered in GREAT PLAINS (43): In Montana, 17 level IV ecoregions (43a through 43e, 43g, 43k Rangeland is extensive, especially in areas of through 43q, and 43s through 43v) have been recognized; they separate areas of distinct terrain, land use, soil, surficial material, climate, and/or potential natural vegetation. Rolling grassland is frigid temperature regime; only the characteristic of large parts of Ecoregion 43, southernmost soils are mesic. but wildlife-rich breaks and rough stony

open ponderosa pine forests or savanna. aridic soils, poor drainage, or dissected terrain; farmland is found locally in Ecoregion 43 such as on the extensive Quaternary terrace deposits of the Judith River Basin. Most soils have a

