## Ecoregions of Utah

Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and shrublands, irrigated valleys, woodlands, forested mountains, and glaciated peaks. quantity of environmental resources; they are designed to serve as a spatial framework Ecological diversity is enormous. There are 7 level III ecoregions and 37 level IV for the research, assessment, management, and monitoring of ecosystems and ecosystem ecoregions in Utah and most continue into ecologically similar parts of adjacent states. components. Ecoregions are directly applicable to the immediate needs of state agencies, including the development of biological criteria and water quality standards and the establishment of management goals for nonpoint-source pollution. They are also relevant to integrated ecosystem management, an ultimate goal of most federal and state

resource management agencies. importance of each characteristic varies from one ecological region to another regardless

Resources Observation Systems (EROS) Data Center. 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), Griffith and others (1994), and Gallant and others (1989).

Utah is made up of arid deserts and canyonlands, salt flats, wetlands, semiarid frameworks for the entire nation.

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), Utah Department The approach used to compile this map is based on the premise that ecological regions of Environmental Quality, Utah Division of Wildlife Resources, Utah Department of can be identified through the analysis of the spatial patterns and the composition of Natural Resources, United States Department of Agriculture-Forest Service (USFS), biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and United States Department of Agriculture-Natural Resources Conservation Service integrity (Wiken 1986; Omernik 1987, 1995). These phenomena include geology, (NRCS), United States Department of the Interior-Bureau of Land Management (BLM), physiography, vegetation, climate, soils, land use, wildlife, and hydrology. The relative and United States Department of the Interior-Geological Survey (USGS)-Earth

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 USFS (Bailey and others, 1994), the USEPA (Omernik 1987, 1995), and the NRCS (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 Utah, where agreement has been reached among multiple resource management agencies, is a step toward attaining consensus and consistency in ecoregion

Bailey, R.G., Avers, P.E., King, T., and McNab, W.H., eds., 1994, Ecoregions and subregions of the United States (map) (supplementary table of map unit descriptions compiled and edited by McNab, W.H. and Bailey, R.G.): Washington, D.C., U.S. Department of Agriculture-Forest Service, scale 1:7,500,000.

Commission for Environmental Cooperation Working Group, 1997, Ecological regions of North America - toward a common perspective; Montreal, Ouebec, Commission for Environmental Cooperation, 71 p. Gallant, A.L., Whittier, T.R., Larsen, D.P., Omernik, J.M., and Hughes, R.M., 1989, Regionalization as a tool for managing environmental resources: Corvallis, Oregon, U.S. Environmental Protection Agency, EPA/600/3-

Griffith, G.E., Omernik, J.M., Wilton, T.F., and Pierson, S.M., 1994, Ecoregions and subregions of Iowa - a framework for water quality assessment and management: The Journal of the Iowa Academy of Science, v. 101,

Omernik, J.M., 1987, Ecoregions of the conterminous United States (map supplement): Annals of the Association of American Geographers, v. 77, no. 1, p. 118-125, scale 1:7,500,000. Omernik, J.M., 1995, Ecoregions - a framework for environmental management, in Davis, W.S. and Simon, T.P., eds., Biological assessment and criteria-tools for water resource planning and decision making: Boca Raton,

areas of the United States: Agriculture Handbook 296, 156 p. U.S. Environmental Protection Agency, 2000, Level III ecoregions of the continental United States (revision of Omernik, 1987): Corvallis, Oregon, U.S. Environmental Protection Agency-National Health and Environmental Effects Research Laboratory, Map M-1, various scales.

U.S. Department of Agriculture-Soil Conservation Service, 1981, Land resource regions and major land resource

Wiken, E., 1986, Terrestrial ecozones of Canada: Ottawa, Environment Canada, Ecological Land Classification Series no. 19, 26 p.



mountains are characteristic of the Central Basin and Range (13). In this aerial photograph taken near Lund, big sagebrush grows in the semi-arid valleys and juniper-pinyon woodland is found at higher elevations on rocky, rugged mountain slopes

## 13. Central Basin and Range

Ecoregion 13 is composed of northerly trending, fault-block ranges and intervening, drier basins. Valleys, slopes, and alluvial fans are either shrub and grass-covered, shrub-covered, or barren. Woodland, mountain brush, and scattered open forests are found at higher elevations on mountain slopes. The potential natural vegetation is, in order of increasing elevation and ruggedness, saltbush-greasewood, Great Basin sagebrush, juniper-pinyon woodland, and scattered western spruce-fir forest. In addition, tule marshes occur locally, especially along the Great Salt Lake shoreline. The Central Basin and Range (13) is internally-drained by ephemeral streams. In Utah, most of Ecoregion 13 lower than about 5,200 feet elevation was inundated by Pleistocene Lake Bonneville. Extensive playas occur and are nearly flat, clayey, and salty. In general, Ecoregion 13 is drier than the Wasatch and Uinta Mountains (19), cooler than the Mojave Basin and Range (14), and warmer and drier than Ecoregions 12 and 80. Ecoregion 13 has more shrubland and less grassland than the Snake River Plain (12) but lacks both the creosote bush of Ecoregion 14 and the extensive, dense forests of Ecoregion 19. Soils grade upslope from mesic Aridisols to frigid Mollisols; Entisols also occur on fans, floodplains, and valley bottoms. Basin soils of Ecoregions 13a, 13b, and 13c are typically more saline and alkaline than those of the sagebrush Steppe Valleys (80i) to the north. The land is primarily used for grazing and a greater percentage is used for livestock grazing than in Ecoregion 14. In addition, some irrigated cropland is found in valleys near mountain water sources. Military bases also are found in Ecoregion 13 and are of environmental significance because of their large area and their unique land uses and management practices.

The **Salt Deserts** ecoregion is nearly level, internally-drained, mostly barren, arid, and nonarable. It contains playas, salt flats, mud flats, and saline lakes. Water levels and salinity fluctuate seasonally and livestock forage. Bitterbrush and western serviceberry are important browse for mule deer. drained. Vegetation, where present, is sparse and composed of salt-tolerant plants such as salicornia and saltgrass.

Ecoregion 13a is used for recreation, transportation, defense in a large transportation defense in the correction and saltgrass. nearby ecoregions and is largely underlain by limestone, dolomite, or quartzite. Only a few streams Ecoregion 13a is used for recreation, transportation, defense installations, and industry including salt production. originate in its fault-block mountains and provide water to lower and drier ecoregions. Mollisols support The Shadscale-Dominated Saline Basins ecoregion is arid, internally-drained, and gently sloping to subalpine fir, Engelmann spruce, bristlecone pine, limber pine, Douglas-fir, mountain big sagebrush, and aspen. nearly flat. Light-colored soils with high salt and alkali content occur and are dry for extended periods. Forest stands are most extensive on upper, north facing slopes. Carbonates influence floristic composition, Vegetation is salt- and drought-tolerant. It is dominated by shadscale, winterfat, and greasewood and is distinct extend the elevational limits of trees, decrease vegetation density, and affect the quantity and quality of water. from the Wyoming big sagebrush of the less saline Ecoregion 13c and the mostly barren Salt Deserts (13a).

The Moist Wasatch Front Footslopes ecoregion supports the bulk of Utah's population and Ecoregion 13b is primarily rangeland, but large livestock and poultry farms are found locally. Irrigated farming is 13f commercial activity. It is fed by perennial streams and aqueducts that originate in the adjacent Wasatch

Range. Irrigated cropland growing alfalfa, vegetables, and small grains as well as orchards are common outside The Sagebrush Basins and Slopes ecoregion is semiarid. The potential natural vegetation is Great Basin of urban areas. Land use has affected stream quality and irrigation diversions have reduced stream flow. sagebrush. It is dominated by Wyoming big sagebrush but perennial bunchgrasses occur and become The nearly level **Wetlands** ecoregion contains rushes, reed grasses, and areas of open water. It is critical creasingly common northward as available moisture increases. However, cool season grasses are less abundant habitat for migratory birds and many state and federal wildlife refuges are found within it. Water levels are often managed, but, nevertheless, marshes can be periodically contaminated by rising saline lakes of steppe. The major land use is grazing, but feedlots, dairy operations, and irrigated cropland are found locally.

drowned by high river runoff. Soils are poorly-drained or very poorly-drained and often salty. Potential natural Ecoregion 13c includes valleys, alluvial fans, and mountain flanks that are not as saline nor as arid as Ecoregions vegetation consists of tule marshes and differs from that of nearby Ecoregions 13a, 13b, 13c, 13i, 80a, and 80i. The **Malad and Cache Valleys** ecoregion contains wide terraces, narrow floodplains, and alluvial fans.

The rocky Woodland- and Shrub-Covered Low Mountains ecoregion is covered by woodland or, at higher elevations, by mountain brush. Its vegetation mosaic is distinct from the surrounding ecoregions. Mountain-fed perennial streams and canals provide water to pastureland, municipalities, and hay, small grain, sugar beet, and fruit crops. Ecoregion 13i is cooler, has a shorter growing season, and has less lake Its mountain slopes, hills, and alluvial fans are higher, wetter, rockier, and more rugged than Ecoregions 13c and influence than Ecoregion 13f. It is wetter, more extensively farmed, and more populated than Ecoregion 13c. 13i and lower and drier than Ecoregion 13e. Entisols and Mollisols occur and are often stony or shallow; Aridisols

Mollisols occur and contrast with the Aridisols of Ecoregion 13c. The Cache Valley has a shorter growing are not as common as in Ecoregions 13b and 13c. Juniper is typically found at lower elevations than pinyon or is season and more snow in winter than the Malad Valley.



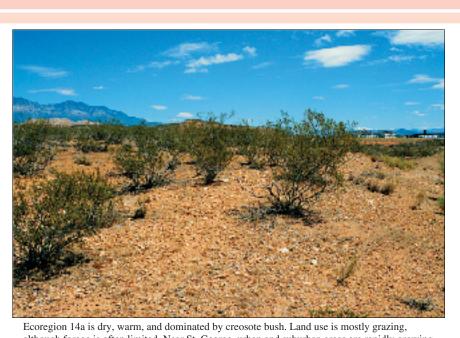


sagebrush and primarily used as rangeland.



sparse stands of salt-tolerant plants occur. 13g support plentiful birdlife.

and runoff has increased the turbidity and



## 14. Mojave Basin and Range

less common than in Ecoregion 80h or the densely populated Moist Wasatch Front Footslopes (13f).

than in Ecoregions 80a and 80i, which are wetter, cooler, and have a potential natural vegetation of sagebrush

13a or 13b. It is less rocky, rugged, and wooded than Ecoregion 13d and not as level as Ecoregions 13a and 13b.

Ecoregion 14 is composed of basins and scattered mountains that are generally lower, warmer, and drier than those of the Central Basin and Range (13). The potential natural vegetation is mapped as creosote bush and is distinct from the saltbush-greasewood, Great Basin sagebrush, sagebrush steppe, and juniper-pinyon woodlands that occur to the north in the Central Basin and Range (13) and Northern Basin and Range (80); it is also distinct from the creosote bush-bur sage and the palo verde-cactus shrub that occur in the Sonoran Basin and Range (81) to the south. Soils are mostly Entisols and Aridisols and have a thermic temperature regime; they are warmer than the soils of Ecoregion 13. Most of Ecoregion 14 is federally-owned and there is relatively little grazing activity because of the lack of water and forage for livestock. Heavy use of off-road vehicles and motorcycles in some areas has caused

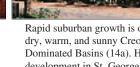
The Creosote Bush-Dominated Basins ecoregion is composed of alluvial fans, valleys, and scattered sustain Wyoming big sagebrush, blackbrush, Mormon tea, yellowbrush, galleta, Indian ricegrass, cheatgrass, and buttes. Ecoregion 14a is lower in elevation, warmer, and has a higher average potential evapotranspiration cholla. The vegetation is distinct from the warmer, lower Creosote Bush-Dominated Basins (14a) and the cooler, than more northerly ecoregions. Soils are alkaline and have a thermic temperature regime. They are warmer than higher Mountain Woodland and Shrubland (14c). the soils of Ecoregion 13 and support creosote bush, Joshua tree, blackbrush, big sagebrush, and associated grasses. Some of its plant species, including Joshua tree, are typical of the Mojave Desert and are absent from the 4,000 and 7,800 feet elevation. Its mountains and mesa tops are higher and temperatures are cooler than rest of Utah. Fauna, particularly reptiles and birds, can also be distinctive; many species occur nowhere else in those of the surrounding Arid Footslopes (14b). Nevertheless, Ecoregion 14c has no perennial streams and its Utah. Today, rangeland is common and irrigated cropland occurs near water sources. Urban and suburban Mollisols and Entisols support only sparse vegetation. Juniper-pinyon woodland and mountain brush occur; development is rapidly expanding in the Saint George area.

The Arid Footslopes ecoregion is composed of footslopes, alluvial fans, hills, basalt flows, mesas, and respectively. The fauna is composed of Mojave Desert indicators including the desert tortoise and the speckled badlands between 3,000 and 5,000 feet elevation in southwesternmost Utah. Sparsely vegetated slopes are rattlesnake. In Utah, Ecoregion 14c is confined to the Beaver Dam Mountains, an eroded fault block with a core characteristic and have a high sediment yield during summer thunderstorms. The soils are Petrocalcids that of Precambrian metamorphic rock.

vegetation is distinct from the creosote bush and sagebrush that are found nearby in Ecoregions 14a and 14b,



Dominated Basins (14a). A sidewinder.



dry, warm, and sunny Creosote Bush-Dominated Basins (14a). Here residential development in St. George is shown next to Joshua trees that occur in the Mojave Deser



18. Wyoming Basin

Ecoregion 18 is a broad intermontane basin containing rolling plains, high hills, mesas, and low mountains. It is dominated by arid grasslands and shrublands. Ecoregion 18 is somewhat drier than the Northwestern Great Plains (43) to the northeast, lacks the extensive pinyon-juniper woodland of the Colorado Plateaus (20) to the south, and does not have the extensive forests of the neighboring Middle Rockies (17), Wasatch and Uinta Mountains (19), and Southern Rockies (21). Much of the ecoregion is used for livestock grazing, although many areas lack sufficient vegetation to adequately support this activity in the long term. Ecoregion 18 also contains major oil and natural gas

The Rolling Sagebrush Steppe is composed of semiarid rolling plains, hills, and mesas; wetter hills, growing season. Wetlands are common and are dominated by sedges, rushes, cattails, and marsh grasses. Its ridges, and outwash fans occur near the Unita Mountains. Soils have an aridic, bordering on ustic, Mollisols and Entisols support irrigated hayland, meadow pasture, and rangeland. Land use, terrain, ar moisture regime and receive more moisture during the growing season than the xeric soils of the Semiarid Bear drainage are all different from neighboring ecoregions. Hills (18d). Big sagebrush and bluebunch wheatgrass are common and unlike the vegetation of the neighboring Wasatch and Uinta Mountains (19) and Colorado Plateaus (20). Ecoregion 18a is primarily rangeland. Repeated

The Semiarid Bear Hills ecoregion is located in the rainshadow of high mountains and is dry during the summer. Soils characteristically have a xeric moisture regime and are drief during the growing season. fires and grazing have affected the natural vegetation and, today, introduced annual grasses can be common.

alluvial fans along the Bear River. The ecoregion is characterized by cold winters, frigid soils, and a short big sagebrush are common and contrast with the forests of neighboring, mountainous ecoregions. Today, he Wyoming Basin (18) is a vast sagebrush steppe. Its rolling plains, mesas, and high hills are most extensive in Wyoming but they also tend into Utah, Colorado, Idaho, and Montana. Grazing pressure and repeated fires have affected its natural vegetation and introduced

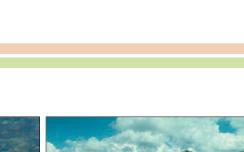
summer. Soils characteristically have a xeric moisture regime and are drier during the growing season than the ustic soils of Ecoregion 18a. The terrain is hilly and is distinct from the Rolling Sagebrush Steppe The Wet Valleys ecoregion consists of very poorly-drained, nearly flat floodplains, low terraces, and (18a), the nearly flat Wet Valleys (18c), and the rugged Wasatch and Uinta Mountains (19). Bunchgrasses and sheep on the rangeland of the Rolling Ecoregion 18d is primarily rangeland. The land use mosaic contrasts with that of Ecoregions 18c and 19.











19. Wasatch and Uinta Mountains

grasses can be common. The Utah portion is flanked by the high Wasatch and Uinta Mountains (19) and often contains foothills.

Ecoregion 19 is composed of high, glaciated mountains, dissected plateaus, foothills, and intervening valleys. It includes the extensively glaciated Uinta Mountains, the Wasatch Range, and the Wasatch Plateau. Agricultural valleys occur especially in the eastern part of the Wasatch Range. The Wasatch Front is steeper, more rugged, and wetter than more easterly parts of the Wasatch Range. Alkaline dust from the Great Basin does not buffer high elevation surface waters against acidification. Streams draining the quartzite-dominated Uinta Mountains and portions of the Wasatch Front that are underlain by acidic intrusive volcanics tend to be non-alkaline, low in nutrients, and low in total dissolved solids. Above an elevation of about 11,000 feet, alpine meadows, rockland, and talus slopes occur and are especially widespread in the Uinta Mountains. Between about 8,000 and 11,000 feet elevation, subalpine forests, Douglas-fir forests, and aspen parkland are widespread with ponderosa pine and limber pine also occurring on the high volcanic plateaus. Between approximately 5,000 and 8,000 feet elevation, juniper-pinyon woodland and mountain mahogany-oak scrub communities occur, with the latter more prevalent in the north than in the south. Lodgepole pine is less widespread and summer livestock grazing is more common than in the Middle Rockies (17). Unlike in the maritime-influenced Northern Rockies (15), Pacific indicator tree species such as grand fir are absent from Ecoregion 19. The ecoregion is used for logging, recreation, homes, and summer grazing.

In Utah, Ecoregion 21 is made up of isolated, laccolithic mountains that protrude from the dry expanses of the Colorado Plateaus (20). The La Sal and Abajo mountains are nearer the Rocky Mountains than the Wasatch Range and

have faunal affinities with the southern Rockies in Colorado. Vegetation, soils, and land use are elevationally banded. Low to middle elevations are grazed and support Gambel oak, widely-spaced ponderosa pine, and mountain

brush. Higher elevations are not as heavily grazed as lower elevations and are largely covered by subalpine fir, Engelmann spruce, Douglas-fir, aspen parkland, and mountain brush. In contrast to Ecoregion 19, lodgepole pine is

The glaciated **Alpine Zone** is composed of mountains above timberline, about 11,500 feet elevation. Soils higher than the Dry Forests and Shrublands (21c). It is dominated by tree species that thrive in cool, humid

are often stony and shallow. They are mostly Inceptisols and have a cryic temperature regime and an udic climates with heavy snow cover, such as subalpine fir and Engelmann spruce. The potential natural vegetation is

moisture regime. Wet meadows, rockland, glacial till, and talus are common and contrast with the dense forests of mapped as southwestern spruce-fir and pine-Douglas-fir forest and is distinct from that of lower and higher

Southern Rockies (21). Runoff from its deep snow pack is a major source of summer water for lower, more arid regime. Land uses include logging, mining, seasonal grazing, and recreation.

neighboring, lower ecoregions. Ecoregion 21a receives more precipitation than surrounding portions of the ecoregions. Soils are mostly Mollisols and Inceptisols and have a cryic temperature regime and an udic moisture

The **Subalpine Forests** ecoregion occupies a narrow elevational band between about 8,800 feet and 21c 9,000 feet elevation. Vegetation, includes Douglas-fir, ponderosa pine, Gambel oak, and an understory

treeline, about 11,500 feet elevation. Ecoregion 21b is lower in elevation than the Alpine Zone (21a) and of mountain brush; it is distinct from the subalpine forests of the higher, wetter Ecoregion 21b and the juniper-

The **Alpine Zone** occurs on mountain tops above timberline, about 11,000 feet elevation. It is especially Douglas-fir and aspen parkland are common and Engelmann spruce and subalpine fir grow on steep, northextensive in the Uinta Mountains. Glacial features dominate the landscape. Meadows and rockland are facing slopes. Vegetation is unlike the lower juniper-pinyon woodland and mountain brush of Ecoregion 19f or common and contrast with the dense forests of neighboring, lower ecoregions. Ecoregion 19a is higher and the alpine meadows of Ecoregion 19a. Perennial streams provide water to lower, more arid regions. receives more precipitation than other parts of Ecoregion 19. Runoff from its deep snow pack is a major source of

The **High Plateaus** ecoregion is largely capped by flat-lying igneous rock and is lithologically distinct summer water for lower, more arid ecoregions. Soils are mostly Inceptisols. They have a cryic temperature regime from the Wasatch Montane Zone (19d). Elevations usually range from about 8,000 to 11,000 feet and and are often stony, shallow, and acidic. Ecoregion 19a is used for seasonal grazing and recreation.

about 11,000 feet. Ecoregion 19b is higher, wetter, more extensively glaciated, and less rugged than Ecoregion found at lower elevations in Ecoregion 19a. 9c but does not receive as much precipitation as the higher Alpine Zone (19a). Its Inceptisols and Alfisols Land use includes logging, seasonal grazing, and recreation. important land uses. Snow melt provides water to lower, more arid ecoregions.

The Mid-elevation Uinta Mountains ecoregion is glaciated and forested. It occupies the elevational zone juniper woodland at lower elevations and ponderosa pine at upper elevations. Overall, the vegetation is distinct between 8,000 and 10,000 feet in the Uinta Mountains. Here Douglas-fir, ponderosa pine, aspen parkland, from Ecoregion 19g, which is lower and drier, and Ecoregions 19d and 19e, which are higher and wetter. and, in the north, lodgepole pine grow. The vegetation is distinct from the lower juniper-pinyon woodlands of Livestock grazing is common. Some rangeland has been cleared of trees and reseeded to grasses. Ecoregions 20c and 20g and the higher, wetter Uinta Subalpine Forests (19b) and Alpine Zone (19a). Ecoregion

The unforested Mountain Valleys ecoregion contains terraces, flood plains, alluvial fans, and hills. It is 19c's terrain is more rugged than Ecoregion 19b. Its deep canyons contain many good quality, perennial streams

19g affected by cold temperatures and has a short growing season. Potential natural vegetation is mostly

19g affected by cold temperatures and has a short growing season. Potential natural vegetation is mostly that are fed by meltwater from the high Uinta Mountains. They provide water to lower, more arid ecoregions.

are accompanied by differences in precipitation and temperature. The subalpine fir, Engelmann spruce, The wet, glaciated Uinta Subalpine Forests ecoregion contains high elevation mountains, glaciated Douglas-fir, and aspen communities of plants and animals are widespread but the ponderosa pine community basins that drop into deep canyons, and many lakes. Elevations range from 10,000 feet to timberline, also occurs at lowest elevations. The vegetation is unlike the juniper-pinyon woodland and mountain brush

support Engelmann spruce, lodgepole pine, and subalpine fir. Such subalpine forests are far more extensive in the

The Semiarid Foothills ecoregion is found between about 5,000 and 8,000 feet elevation. Widely Uinta Mountains than in the less massive Wasatch Range. Logging, seasonal grazing, and recreational activity are spaced juniper and pinyon typically occur in a matrix of sagebrush, grama grass, mountain mahogany, and Gambel oak. Maple-oak scrub is common in the north but, southward, it is gradually replaced by pinyon-

Great Basin sagebrush. It is distinct from the juniper-pinyon woodland and mountain mahogany-oak scrub of habitat modification. The partially glaciated Wasatch Montane Zone consists of forested mountains and plateaus underlain by Ecoregion 19f. Today, irrigated cropland, irrigated pastureland, and rangeland are common. Turkey farms, sedimentary and metamorphic rocks. It is lithologically distinct from the igneous rocks of Ecoregion 19e. feedlots, and dairy operations occur locally. Land use contrasts with that of nearby high plateaus and mountains.

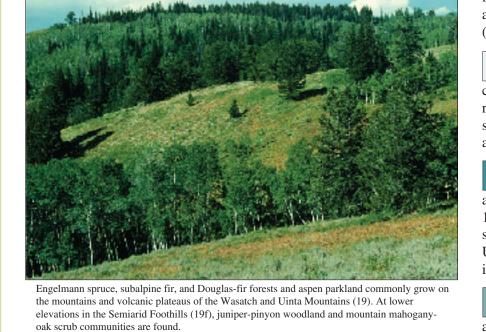


Cutthroat trout are found in the streams of the High areas near treeline receive large amount of precipitation and have been extensively glaciated. Cirques, tarns, moraines, and ockland are common and are used for



Mountains (19) are logged. Timber harvest can widespread in the meadows and forests of the

recreation and seasonal grazing.



20. Colorado Plateaus Ecoregion 20 is an uplifted, eroded, and deeply dissected tableland. Its benches, mesas, buttes, salt valleys, cliffs, and canyons are formed in and underlain by thick layers of sedimentary rock. Juniper-pinyon woodland dominates higher elevations and is far more extensive than in the Wyoming Basin (18). Saltbush-greasewood and blackbrush communities are common at lower elevations but are generally absent from the higher Arizona/New Mexico Plateau (22). Summer moisture from thunderstorms supports warm season grasses not found in the Central Basin and Range (13). Many endemic plants occur and species diversity is greater than in Ecoregion 13. Several national parks are located in this ecoregion and attract many visitors to view their arches, spires, and canyons. Major gas and oil fields are found in the Uinta Basin portion of Ecoregions 20c, 20f, and 20g. The gently sloping Monticello Upland is blanketed by eolian material deposited in the lee of the Abajo Mountains. It receives more precipitation in a typical year than the surrounding portions of Ecoregion 20c.

The Escarpments ecoregion is characterized by extensive, deeply-dissected, cliff-bench complexes that ascend dramatically from Ecoregions 20b or 20c to the forested mountain rim. Local relief can be as

soils occur along the rims of benches and minor escarpments and support pinyon-juniper woodland. The arid **Shale Deserts** ecoregion consists of nearly level benches, low rounded hills, and badlands. It is sparsely vegetated with mat saltbush, bud sagebrush, galleta and desert trumpet. Soils are mostly Entisols and Aridisols; they are mostly shallow and clayey and contain salts and gypsum. Clayey soils swell when moist and Tavaputs Plateau. Because of its topographic position, precipitation is low and soils are arid. and are slowly permeable. Surface runoff and resultant erosion occur during and after rainstorms. Scattered, Winters are constantly cold and often foggy due to frigid, dense air draining from the adjacent uplands and gravel-capped benches occur and protrude from the present denudational surface because they are much more resultant air temperature inversions. Ecoregion 20f is distinguished from other arid basins by the abundant resistant to erosion than the surrounding shales. Deep, vertical-walled arroyos are carved where surface water stream runoff it receives from the mountains. Streams are often diverted for irrigation. Alfalfa, small grain and

alkaline soils that support greasewood, alkali sacaton, seepweed, and shadscale. The Semiarid Benchlands and Canyonlands ecoregion is characterized by broad grass-, shrub-, and contributing salinity to the Green River and its tributaries. Non-irrigated areas are used for livestock grazing.

Overall, the vegetation is not as sparse as in drier areas such as Ecoregions 20b, 20d, and 20h. The Arid Canyonlands ecoregion includes the inner gorge of the Colorado River and its major tributaries. Much of this ecoregion is bounded by nearly vertical, canyon walls that separate it from the

ecoregions. It is used for recreation and seasonal grazing like the similar but more extensive Alpine Zone (19a).

Sal Mountains, pictured here, exhibit elevational banding. Above about 11,000 feet elevation, the Alpine Zone (21a) is found and

the background. Between about 8,800 and 11,000 feet elevation, the Subalpine Forests (21b) ecoregion occurs and is in the

Deep, silty Mollisols are characteristic and are able to retain enough available moisture to naturally support great as 3,000 feet. Ecoregion 20e includes major scarp slopes of the Tavaputs Plateau, the Book Cliffs, and the Wyoming big sagebrush and associated grasses. These soils now sustain dryland farming for winter wheat and Grand Staircase. Natural vegetation ranges from Douglas-fir forest on steep, north-facing slopes at higher pinto beans. This is the only extensive dryland farming area in the Utah portion of Ecoregion 20. Shallow or stony elevations to desert and semidesert grassland or shrubland on lower, drier sites. Pinyon-juniper woodland often dominates escarpments and benches that are covered by shallow soils. This rugged, remote, and varied

concentrates. These arroyos are major contributor of sediment and salt to the Colorado River. Floodplains have corn are grown for silage on arable, gently sloping terraces and valley floors. Stonier soils are irrigated for pasture where and when water is available. Excessive irrigation leaches salts from the underlying shale, woodland-covered benches and mesas. Elevations mostly range from 5,000 to 7,500 feet and are higher

The North Uinta Basin Slopes ecoregion is a foothill area characterized by numerous mountain-fed

than those of the Arid Canyonlands (20d). Low escarpments separate remnant mesa tops and narrow canyons streams that are entrenched into benches. It is warmer in winter, cooler in summer, and receives more from surrounding benches. Bedrock exposures (e.g. slickrock and fins) are common along rims, escarpments, and annual precipitation than the Uinta Basin Floor (20f). Its large number of perennial streams and extensive, stony on steep dip slopes. Soils are mostly Entisols. These deep eolian soils are composed of fine sand and support outwash deposits set it apart from Ecoregion 20c. Pinyon-juniper woodland is common. Mountain brush occu warm season grasses, winterfat, Mormon tea, four-wing saltbush, and sagebrush. Pinyon and juniper occur on at higher elevations and riparian vegetation is found along stream courses. Vegetation and climate contrast with shallow, stony soils. Fire suppression and erosion has allowed this woodland to expand beyond its original range. the Douglas-fir forests of the higher and wetter Ecoregion 19c. Land use is mostly grazing and irrigated pasture but there is also some irrigated farmland. Major gas and oil fields are located within Ecoregion 20g.

adjacent, higher benchlands of Ecoregion 20c. Soils are shallower and have a drier moisture regime than those of have a low water holding capacity. They have a drier moisture regime than the soils of Ecoregions 20a and 20c. Ecoregions 20a and 20c. Exposed bedrock is common. Blackbrush, shadscale, and drought tolerant grasses On average, they receive only 5 to 8 inches of precipitation annually. Vegetation is sparser than in Ecoregion including galleta and Indian ricegrass occur. Blackbrush is much more common than in Ecoregion 20c where 20c and stock carrying capacity is limited. Shifting sand is mostly devoid of vegetation while soils on stable pinyon-juniper woodland and sagebrush dominate. Some cropland and residential development occur near Moab. sand blankets support drought-tolerant plants including Indian ricegrass, sand dropseed, yucca, and blackbrush.

The **Dry Forests and Shrublands** ecoregion includes lower mountain slopes between about 7,500 and

pinyon woodland of Ecoregion 20c. Soils are mostly Mollisols and have a frigid temperature regime and an

ustic moisture regime. Land use includes livestock grazing, mineral extraction, and recreation. Perennial streams

are diverted for irrigation and can be dry in their lower reaches in the summer.



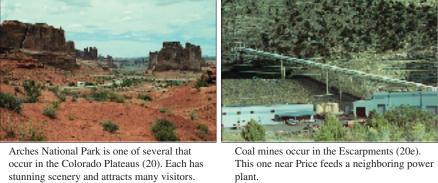
ecoregion has a low stock carrying capacity. Semiarid Benchlands and Canyonlands (20c)



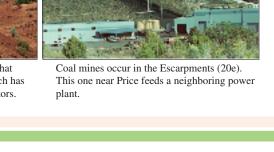
Strath terraces and cliffs over 1,000 feet high

Canals bring irrigation water from the Uinta Mountains to the Northern Uinta Basin Slopes





Arches National Park is one of several that





They are found on high mountain pastures

during the summer and on densely forested

on the lower parts of the La Sal Mountains in Ecoregion 21c. In the background, Ecoregion 21a occurs above treeline.

Ecoregion 80 consists of dissected lava plains, rolling hills, alluvial fans, valleys, and scattered mountains. Although arid, it is higher and cooler than Ecoregion 12 and has more available moisture than Ecoregion 13. Non-mountain

areas have sagebrush steppe vegetation; cool season grasses and Mollisols are more common than in the hotter-drier basins of Ecoregion 13 where Aridisols support sagebrush, shadscale, and greasewood. Ranges are covered in mountain sagebrush, mountain brush, Idaho fescue, Douglas-fir, subalpine forests, or aspen. Juniper woodlands occur on rugged, stony uplands. Rangeland is common but dryland and irrigated cropland are found locally. Ecoregion 80 is found in the northernmost part of Utah beyond the extent of Pleistocene Lake Bonneville. The Raft River Mountains contain mammal and plant species that are typical of the Columbia Plateau but absent from the rest of Utah. The **Dissected High Lava Plateau** ecoregion consists of alluvial fans, rolling plains, and hills. It is more matrix of black sagebrush or mountain sagebrush. Open grassland grows on wide ridge tops. The climate and

and 80c. The potential natural vegetation is mostly sagebrush steppe but scattered woodlands are found on rocky dominated by sagebrush steppe, shrublands, or juniper woodlands. Soils have a cryic temperature regime and and gravelly uplands. Wyoming big sagebrush, black sagebrush, bluebunch wheatgrass, and Idaho fescue are are colder than the frigid and mesic soils of Ecoregion 80a. Mollisols are widespread and are unlike the abundant; bunchgrasses are more common than in Ecoregion 80b. Overall, Ecoregion 80a is less wooded than Aridisols that are common in Ecoregions 13b and 13c. Ecoregions 80b and 80c and lacks the saltbush-greasewood of Ecoregions 13b and 80h. Mollisols are common

The arid Saltbush-Dominated Valleys ecoregion is externally-drained and composed of gently sloping and are distinct from the Aridisols of Ecoregions 13b and 13c. Most soils have a frigid temperature regime and **80h** are colder than the mesic soils of Ecoregion 13c but warmer than the cryic soils of Ecoregion 80c. Land use is greasewood. The potential natural vegetation is distinct from the Great Basin sagebrush of Ecoregion 13c and The Semiarid Hills and Low Mountains ecoregion is composed of mountain slopes, hills, and alluvial common; they are dry for extended periods. Land use is primarily rangeland and irrigated agriculture. Irrigated fans. It occupies the elevational belt between the High Elevation Forests and Shrublands (80c) and the farming is more common than in the internally-drained Shadscale-Dominated Saline Basins (13b).

valley bottoms that are dominated by salt tolerant vegetation including shadscale, winterfat, and the sagebrush steppe of Ecoregions 80a and 80i. Light-colored soils with high salt and alkali content are

The Sagebrush Steppe Valleys ecoregion consists of gently sloping, unforested terraces, basin rims, includes shrublands and woodlands but lacks the forest components of the wetter Ecoregion 80c. Cool season valley bottoms, and alluvial fans that are not as arid as Ecoregions 13a, 13b, 13c and 80a. Ecoregion 80i grasses are more common and there is more available moisture than in Ecoregion 13c. Pinyon is near its is less saline than Ecoregions 13a, 13b, and 80h and is lower in elevation, less rocky, and less rugged than Ecoregions 13d, 80b, and 80c. The potential natural vegetation is sagebrush steppe and contrasts with the Great



on the plains and summer in the foothills.



The sedimentary rock of the Colorado Plateau has been uplifted

and deeply dissected. Chasms, cliffs, valleys, and mesas occur.

Dry, hot canyonlands are found at lowest elevations and are dominated by blackbrush, tamarisk, and bare rock. At higher elevations, semiarid benches covered in shrubland or woodland

Photo: Alan J. Woods

80 Northern Basin and Range

80a Dissected High Lava Plateau

80b Semiarid Hills and Low

80c High Elevation Forests and

80h Saltbush-Dominated Valleys

120 km

ATURAL RESOURCES Division of Wildlife Resources

80i Sagebrush Steppe Valleys

SCALE 1:1 175 000

Albers Equal Area Projection

Standard parallels 38° N and 41° N

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summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,175,000).

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Domeier, M., and Comstock, J.A., 2001, Ecoregions of Utah (color poster with map, descriptive text,

James H. Wheeler (Environmental Technology Office, West Desert Test Center, U.S. Army).

Water Quality), Mike Domeier (NRCS), and Jeffrey A. Comstock (OAO Corporation).

Thorson (NRCS), and Tom Toole (Utah Division of Water Quality).

Bunchgrass and sagebrush dominate the valleys, alluvial fans, and mountain flanks of the Northern Basin and Range (80). Much of the region is used as rangeland. Scattered junipers are found amid bunchgrasses and sagebrush in higher, more rocky locations.



absent from Ecoregion 21. The highest elevations have alpine characteristics.

21. Southern Rockies

arid than Ecoregion 80i and is lower in elevation, less rocky, and much less rugged than Ecoregions 80b vegetation mosaics of Ecoregion 80c are unlike those of nearby lower and drier Ecoregions 80a and 80b that are

primarily rangeland and wildlife habitat but some irrigated pastureland and cropland also occur. lower, less rugged Dissected High Lava Plateau (80a) and Sagebrush Steppe Valleys (80i). Ecoregion 80b

distributional limit in northern Utah and is much rarer than in Ecoregion 13d to the south.

The **High Elevation Forests and Shrublands** ecoregion is composed of steep, rugged mountains that Basin sagebrush of Ecoregion 13c and the saltbush-greasewood of Ecoregions 13b and 80h. Cool season grasses have cold winters. Douglas-fir, aspen, and stands of subalpine conifers occur in isolated pockets within a are more common than in Ecoregion 13c and nonirrigated cropland is common.

in the Lower Bear Valley of Ecoregion 80i.



Map Source USEPA, 2000

13 Central Basin and Range

13c Sagebrush Basins and Slopes

13f Moist Wasatch Front Footslopes

14 Mojave Basin and Range

14a Creosote Bush-Dominated Basins

14c Mountain Woodland and Shrubland

13i Malad and Cache Valleys

13b Shadscale-Dominated Saline Basins

13e High Elevation Carbonate Mountains

13d Woodland- and Shrub-Covered Low Mountains

13a Salt Deserts

13g Wetlands

14b Arid Footslopes



Level III Ecoregions of the Conterminous United States



18 Wyoming Basin

18d Semiarid Bear Hills

19b Uinta Subalpine Forests

19d Wasatch Montane Zone

18c Wet Valleys

19a Alpine Zone

19e High Plateaus

19f Semiarid Foothills

19g Mountain Valleys

18a Rolling Sagebrush Steppe

19 Wasatch and Uinta Mountains

19c Mid-elevation Uinta Mountains



5 Sierra Nevada

10 Columbia Plateau

1 Blue Mountains

16 Idaho Batholith

17 Middle Rockies

18 Wyoming Basin

20 Colorado Plateau

21 Southern Rockies

25 Western High Plains

27 Central Great Plains

26 Southwestern Tablelands

12 Snake River Plain

Central Basin and Rang

14 Mojave Basin and Rang

19 Wasatch and Uinta Mountain

22 Arizona/New Mexico Plateau

23 Arizona/New Mexico Mountain



**20** Colorado Plateaus

20c Semiarid Benchlands and

Level III ecoregion County boundary

30 Edwards Plateau

1 Southern Texas Plains

Ouachita Mountain

38 Boston Mountains

9 Ozark Highlands

40 Central Irregular Plains

Canadian Rockies

44 Nebraska Sand Hills

46 Northern Glaciated Plains

47 Western Corn Belt Plains

49 Northern Minnesota Wetlands

50 Northern Lakes and Forest

53 Southeastern Wisconsin Til

54 Central Corn Belt Plains

55 Eastern Corn Belt Plains

Indiana Drift Plains

48 Lake Agassiz Plain

52 Driftless Area

32 Texas Blackland Prairies

East Central Texas Plains 34 Western Gulf Coastal Pla

Level IV ecoregion State boundary

60 Northern Appalachian Plateau

2 North Central Appalachi

64 Northern Piedmont

66 Blue Ridge Mountains

68 Southwestern Appalachia

70 Western Allegheny Plateau

2 Interior River Lowland

Southern Coastal Plain

76 Southern Florida Coastal F

73 Mississippi Alluvial Plain

74 Mississippi Valley Loess Pl

69 Central Appalachians

65 Southeastern Plain

67 Ridge and Valley

/1 Interior Plateau

77 North Cascades

78 Klamath Mountains

79 Madrean Archipelago

80 Northern Basin and Range

81 Sonoran Basin and Range

Laurentian Plains and Hills

83 Eastern Great Lakes and Hudson

63 Middle Atlantic Coastal Plai

61 Erie Drift Plain

29 Central Oklahoma/Texas Plains 57 Huron/Erie Lake Plains

56 Southern Michigan/Northern 84 Atlantic Coastal Pine Barrens

Canyonlands

20a Monticello Upland

20b Shale Deserts

20d Arid Canyonlands

20f Uinta Basin Floor

20e Escarpments



**20 Colorado Plateaus** (continued)

30 20 10 0

20g Northern Uinta Basin Slopes

21 Southern Rockies

21c Dry Forests and Shrublands

20h Sand Deserts

21a Alpine Zone

21b Subalpine Forests

