Chapter 2—Area Profile

Resources

2.1. Regional Context

The State

Idaho is the 14th largest state in the United States and has an area of (83,570 square mi [mi^2]) including 823 mi^2 of inland water. Idaho, in shape, consists of a broad rectangular area in the south, based on the line of latitude 42° north, and a perpendicular, long, narrow strip, that at its northmost end borders Canada, known as the Panhandle. The state has a maximum length from north to south of 483 mi, and it varies in width from 308 mi along its southern border to only 45 mi in the Panhandle. The mean elevation is approximately 5,000 ft. In 2009, it was estimated that 65% of Idaho's total land area is administered by agencies of the federal government.

Physiographic Provinces

Idaho can be divided into four physiographic provinces, each of which is part of a larger physiographic region of the United States. The four provinces are the Northern Rocky Mountains, Middle Rocky Mountains, Columbia Plateau, and Basin and Range. The Northern and Middle Rocky Mountain provinces are parts of a larger physiographic division, the Rocky Mountain System. The Columbia Plateau and the Basin and Range provinces are part of the larger Intermontane Plateaus.

2.2. Ecoregions

An ecoregion (also known as ecological system region or ecological region) is an area that exhibits similarity in ecosystem and in the type, quality, and quantity of its environmental resources. Because of these similarities, an ecoregion can be used as a spatial framework within the context of resource management.

Ecoregions have been classified into four levels, level I, the most coarse, to level IV, the most fine. The importance of all levels of ecoregions, and particularly those of levels III and IV to the AMS and the Upper Snake planning effort, is their availability for use and consideration by resource specialists within the framework of their individual and collective resource analyses. Physiographic provinces are different than ecoregions and are discussed in more detail in **Section 2.4,** Geology.

Ecoregions that occur within the Upper Snake PA are presented, and briefly described, from level I to level IV. Level I and level II ecoregion information is from the work of the Commission for Environmental Cooperation (CEC 2006, 1997). Level III and IV ecoregion information for Idaho is from the work of McGrath and others (2001). **Table 2-1** presents these ecoregions in relationship to each other contextually and includes approximate acreages for the level IV ecoregions within the Upper Snake PA and the FOA. The level IV ecoregions are shown in **Figure A-2, Appendix A–Maps**.

Table 2-1. Level I—Level IV ecoregions within the Upper Snake PA.

Level I Ecoregions	Level II Province	Level III Ecoregions (Ecoregion Number)	Level IV Ecoregions (by Ecoregion Number)	Level IV Ecoregions	
				Upper Snake PA (acres)	Upper Snake FOA (acres)
Northern American Deserts	Cold Desert	Snake River Plain (12)	12b— Lava Fields	161,704	129,359
			12d—Dissected Plateaus and Teton Basin	672,666	11,568
			12e—Upper Snake River Plain	690,651	17,283
			12g—Eastern Snake River Basalt Plains	2,587,944	950,384
		Northern Basin and Range (80)	80b—Semiarid Hills and Low Mountains	28,305	4,267
			80i—Sagebrush Steppe Valleys	4,595	112
Northwestern Forested Mountains	Western Cordillera	Idaho Batholith (16)	16d—Dry, Partly Wooded Mountains	1,080	0
			16f—Foothill Shrublands–Grasslands	12,563	6,975
		Middle Rockies (17)	17aa—Dry Intermontane Sagebrush Valleys	560,826	305,756
			17ab—Dry Gneissic–Schistose–Volcanic Hills	634,452	328,300
			17ap—Sedimentary Subalpine Zone	289	0
			17e—Barren Mountains	494,301	29,066
			17g—Mid-elevation Sedimentary Mountains	1,785	1,085
			17h—High Elevation Rockland Alpine Zone	78,075	0
			17j—West Yellowstone Plateau	563,984	8,902
			17l—Gneissic–Schistose Forested Mountains	8,628	105
			17n—Cold Valleys	43,164	2,417
			17o—Partly Forested Mountain	585,438	14,060

2.2.1. Level I

North America has been divided into 15 large, level I ecoregions, highlighting major ecological areas and providing the broad backdrop to the ecological mosaic of the continent. The broadness of level I is best used in context at the global or intercontinental scales. The Upper Snake PA includes two level I ecoregions within its bounds: the Northern American Deserts, which is characteristic of most of the Upper Snake PA and the Northwestern Forested Mountains ecoregion, which roughly borders the Upper Snake PA on its north and east sides. Brief descriptions from the work of the CEC (1997) of these two ecoregions follow.

Northern American Deserts, Ecoregion 10

The North American Deserts ecological region in its entirety extends from eastern British Columbia in the north, to Baja California and north central Mexico in the south. The region is distinguished from the adjacent forested mountain ecological region by its aridity, its unique shrub and cactus vegetation with a lack of trees, and generally lower relief and elevations. Population centers have historically been small, but several urban areas have recently experienced rapid growth.

Physical Setting

The North American Deserts are comprised of a mix of physiographic features but, in general, the area consists of plains with hills, plains with mountains, and plateaus of high relief. In the north, the flat to rolling topography of the Columbia/Snake River Plateau consists of loess and volcanic ash deposits on basaltic plains. The Great Basin and its adjacent mountains contain hundreds of north–south trending fault-block mountain ranges separated by broad valleys; the valley floor elevations are often over 3,000 ft above sea level and many of the ranges exceed 10,000 ft. Within the basin are found many dry lake beds, or playas, with alluvial fans and bajadas at the margin slopes. Sand dunes occur in some areas. Wind and water erosion has left impressive canyons, cliffs, buttes and mesas. Soils of the region are dry, generally lacking organic material and distinct soil profiles, and are high in calcium carbonate.

This ecological region has a desert and steppe climate: arid to semiarid, with marked seasonal temperature extremes. This aridity is the result of the rain shadow of the Sierra Nevada, Cascade Mountains, and Sierra Madre ranges as they intercept the wet winter air masses brought by the westerly and easterly winds. The Rocky Mountains also block some moist Gulf Coast air masses that cross the Great Plains.

Biological Setting

In this ecological region of altitudinal, latitudinal, and landform diversity, there is a variety of vegetation types but low growing shrubs and grasses predominate. In the northern Palouse area, grasslands and sagebrush steppes were once common. However, most of these northern grasslands have been converted to agriculture, and in some areas the sagebrush steppe is being invaded by western juniper and cheatgrass. The Great Basin is characterized by sagebrush, with shadscale and greasewood on more alkaline soils.

Larger mammals are not abundant in the desert areas, but include mule deer, pronghorn antelope, coyotes, bobcats, and badgers. Rabbits, ground squirrels, kangaroo rats, mice, and bats are the most common of the smaller mammals.

Birds, depending on where found, are characteristic of either the sagebrush communities, such as the sage thrasher, sage sparrow, and sage-grouse, or the southern warmer deserts, for example, Gambel's quail, scaled quail, Gila woodpecker, Costa's hummingbird, and the curve-billed thrasher.

Reptiles also vary in the northern and southern deserts in a similar fashion, so gopher snakes, various species of rattlesnakes, and sagebrush lizards are found in more northern deserts while horned lizards, geckos, Gila monsters, and desert tortoises are found further south.

Historical Human Activities

Aboriginal hunter–gatherer populations in these desert areas were small, and their impacts on the environment were slight. Some Native American cultures in the southwestern deserts practiced intensive agriculture locally, employing canal irrigation, terraces, and checkdams. Irrigation was also conducted by Spanish settlers in the southern part of the region, and by settlers in Utah from the mid-1800s.

Northwestern Forested Mountains, Ecoregion 6

This ecological region extends from Alaska south through southern Yukon, interior British Columbia and the Alberta foothills, through northern California and into Nevada. It contains the highest mountains of North America and some of the continent's most diverse mosaics of ecosystem types, ranging from alpine tundra to dense conifer forests to dry sagebrush and grasslands. There are major river systems, including the headwaters to both the Fraser and Columbia rivers. The basis for aggregating all this diversity into one ecological region is topographic—the chains of mountains that traverse its whole length. This region is a major tourist area for skiing, hiking and other outdoor recreational pursuits. Substantial forestry and mining activity occur throughout.

Physical Setting

This ecological region consists of extensive mountains and plateaus separated by wide valleys and lowlands. Most of these plains and valleys are covered by moraine and, to some degree, fluvial and lacustrine deposits, whereas the mountains consist largely of colluvium and rock outcrops. Numerous glacial lakes occur at higher elevations. Soils are variable, encompassing shallow soils of alpine sites and nutrient-poor forest soils of the mountain slopes, as well as soils suitable for agriculture and those rich in calcium that support natural dry grasslands.

The climate is subarid to arid and mild in southern lower valleys, humid and cold at higher elevations within the central reaches, and cold and subarid in the north. Moist Pacific air and the effect of orographic rainfall control the precipitation pattern such that both rain shadows and wet belts are generated, often in close geographic proximity to each other. The rain shadow cast by the massive coastal mountains results in a relatively dry climate. The Rocky Mountains also impede the westward flow of cold, continental Arctic air masses. Mean annual temperatures range between 21°F in the north to 45–50°F in the south. Mean summer temperatures range from 50–70°F, whereas mean winter temperatures range from -9–32°F. Annual precipitation varies with elevation, from 102 in. in the Cascade Mountains to the north, to 16 in. in other mountainous areas, to 10–20 in. in the valleys.

Biological Setting

Vegetative cover is extremely diverse: alpine environments contain various herb, lichen, and shrub associations; whereas the subalpine environment has tree species such as lodgepole pine, subalpine fir,

and Engelmann spruce. With decreasing elevation, the vegetation of the mountainous slopes and rolling plains turns into forests characterized by ponderosa pine; interior Douglas-fir; lodgepole pine, and quaking aspen in much of the southeast and central portions; and western hemlock, western red cedar, Douglas-fir and western white pine in the west and southwest. White and black spruce dominates the plateaus of the north. Shrub vegetation found in the dry southern interior includes big sagebrush, rabbit brush, and bitterbrush. Most of the natural grasslands that existed in the dry south have vanished, replaced by urban settlement and agriculture.

Characteristic mammals include mule deer, elk, moose, mountain goat, California bighorn sheep, coyote, black and grizzly bear, hoary marmot and Columbian ground squirrel. Typical bird species include blue grouse, Steller's jay, and black-billed magpie.

Human Activities

Commercial forest operations have been established in many parts of the ecoregion, particularly in the northern interior sections. Mining, oil and gas production, and tourism are the other significant activities. In the eastern Rocky and Columbia mountains, however, national and provincial parks have been established for recreational use or as reserves for wildlife habitat. It is mainly in the valleys that areas have been improved for pasture or agriculture. The southern valleys are important for their orchards and vineyards. More than half of the region's people live in cities and towns.

2.2.2. Level II

There are 50 level II ecoregions for North America, which are intended to provide a more detailed description of the large ecological areas nested within the level I regions.

In the case of the Upper Snake PA, level II ecoregions are similar to the level I ecoregions in size, expanse, location, and characteristics; as such, evel II descriptions is this section are very brief. The level II ecoregions within the Upper Snake PA are Cold Deserts (Ecoregion 10.1) and the Western Cordillera (ecoregion 6.2).

10.1—Cold Desert

A desert is an area where vegetation cover is sparse and where precipitation is overall rare and infrequent. Deserts usually have large changes in temperature both seasonally, daily, and between daytime and night. A cold desert tends to have much of its overall precipitation in the form of snow rather than rain. The Cold Desert ecoregion within the Upper Snake PA is considered semi-arid where the mean annual precipitation is 10–20 in.

6.2—Western Cordillera

A cordillera refers to a major mountain system and includes the plateaus, valleys, and plains enclosed by the mountains. The Western Cordillera refers, in general, to the major mountain system(s) throughout the western part of North America. The Western Cordillera refers to the mountain ranges that lie within the Upper Snake PA and adjacent to it on its west, north, and east sides. More information about these ranges is provided in **Section 2.4**, Geology.

2.2.3. Level III

Level III ecoregions are smaller ecological areas nested within the level II regions. North America currently contains 182 ecoregions, with the conterminous United States having 84 ecoregions. These smaller divisions are useful for environmental monitoring, assessment and reporting, and decision-making. Because level III regions are smaller, they allow locally defining characteristics to be identified and lend themselves well to the development of corresponding management strategies.

The Upper Snake PA has four level III ecoregions within its bounds: the Snake River Plain and the Northern Basin and Range fall within the level II Cold Desert and the Idaho Batholith, and the Middle Rockies fall within the level II Western Cordillera.

Snake River Plain (Ecoregion 12)
The plains and low hills of ecoregion 12 are part of the xeric intermontane west. Where irrigation water and soil depth are sufficient, sugar beets, potatoes, alfalfa, small grain, or vegetables are grown. Elsewhere, livestock grazing occurs and cattle feedlots and dairy operations are found. Potential natural vegetation is mostly sagebrush steppe but barren lava fields and saltbush–greasewood also occur. Streams generally have low gradients, are warmer, and have finer-grained substrates than do streams in the montane ecoregions. Streams typically have high primary productivity than streams with a forest canopy overstory. Generally in Ecoregion 12, streams with fish typically have minnows and suckers with some salmonids and sculpins present. In addition, many large springs (e.g., along the Snake River) also support endemic fish and mollusk species.

Idaho Batholith (Ecoregion 16)
Ecoregion 16 is mountainous, deeply dissected, partially glaciated, and characteristically underlain by granitic rocks. Soils derived from granitics are droughty and have limited fertility, and therefore provide only limited amounts of nutrients. These soils are highly erodible when vegetation is removed. Maritime influence is slight and lessens toward the south. Grand fir, Douglas-fir, western larch and, at higher elevations, Engelmann spruce and subalpine fir occur; ponderosa pine, shrubs, and grasses grow in deep canyons. Land uses include logging, grazing, and recreation. Streams are likely to suffer from increased loads of fine sediments after disturbance by humans. Declining anadromous fish runs once brought much needed nutrients but are now in danger of extirpation due to dams on the Columbia and lower Snake rivers, hatchery operations, and habitat degradation. Fish composition is primarily cold-water adapted species such as salmonids, sculpin, sucker, and dace, and macroinvertebrates are similar to those found in the Snake River Plain ecoregion (12), Middle Rockies ecoregion (17), and the Northern Basin and Range ecoregion (80).

Middle Rockies (Ecoregion 17)
The climate of Ecoregion 17 lacks the strong maritime influence seen in north Idaho (in the North Rockies ecoregions). Mountains have Douglas-fir, subalpine fir, and Engelmann spruce forest and alpine areas. Pacific tree species are never dominant and forests can have open canopies. Foothills are partly wooded or are shrub and grass covered. Intermountain valleys are grass and/or shrub-covered and contain a mosaic of terrestrial and aquatic fauna that is distinct from nearby mountains. Many mountain-fed streams occur. Stream fish have low diversity, few native species present, and are dominated by salmonids and cottids. The Lost Rivers of Idaho constitute a unique set of isolation lotic environments

that are separated from other systems by the Eastern Snake River Basalt Plains. Fish populations may also be seasonally isolated by the intermountain valleys of this ecoregion.

Northern Basin and Range (Ecoregion 80)
Ecoregion 80 consists of dissected lava plains, rolling hills, alluvial fans, valleys, and scattered mountains. It is higher and cooler than Snake River Plain ecoregions and has more available moisture than Central Basin and Range ecoregions to the south, which cross the Idaho–Utah border. The Northern Basin and Range supports sagebrush grassland or saltbush–greasewood vegetation, cool season grasses, and Mollisols are common. The Northern Basin and Range ecoregion is covered in mountain sagebrush, Idaho fescue, Douglas-fir, and aspen. Juniper woodlands occur on rugged, stony uplands; both rangeland and cropland occur. The Northern Basin and Range lies between the Central Basin and Range ecoregions to the south and Blue Mountains and Snake River Plain ecoregions to the north. The Northern Basin and Range ecoregion's southern boundary is the highest shoreline of Pleistocene Lake Bonneville that once inundated much of the Central Basin and Range ecoregions, but not the Northern Basin and Range. Stream fish communities share features of Snake River Plain (12) and Middle Rockies (17) ecoregions.

2.2.4. Level IV

Within the four Level III ecoregions found within the Upper Snake PA, there are 18 Level IV ecoregions. The Level IV ecoregions are shown with their counterpart Level III ecoregions in **Table 2-1** and include approximate acreages for the Upper Snake PA and for the FOA. Brief descriptions of the Level IV ecoregions are provided below.

Snake River Plain (12) Level IV Ecoregions
12b—Lava Fields Ecoregion
Ecoregion 12b contains basalt flows, cinder cones, and spatter cones. Exposed basalt or very shallow loessial soils over volcanics are characteristic and are either barren or sparsely covered by hardy shrubs and grasses. Livestock carrying capacity is low. Surface water availability is very limited. This ecoregion includes the Craters of the Moon National Monument and Preserve and part of the INL. Lithology, depth to bedrock, livestock carrying capacity, and water availability are unlike neighboring ecoregions.

12d—Dissected Plateaus and Teton Basin Ecoregion
Ecoregion 12d is used as cropland and rangeland. Sprinkler-irrigated land supports potatoes (an important cash crop), alfalfa, and pasture; surface irrigation is far less common than in the Upper Snake River Plain ecoregion (12e, next section), which is lower, flatter, and adjacent to the Snake River. Non-irrigated land grows small grains. Mollisols developed in thick loess deposits or alluvium and are subject to wind erosion. Loess is far more extensive than in the Upper Snake River Plain ecoregion (12e). Potential natural vegetation is sagebrush steppe and is unlike the forest of the higher, more rugged Middle Rockies (17) ecoregions. Wet meadows occur in the poorly drained, relatively cold Teton Basin.

12e—Upper Snake River Plain Ecoregion
Ecoregion 12e is nearly level and contains cropland, pastureland, cities, suburbs, and industries. Extensive surface-irrigated small grain, sugar beet, potato, and alfalfa farming occurs. The frost-free season is shorter and crop variety is less than downstream ecoregions. The Upper Snake River Plain ecoregion is lower and less rugged than the Dissected Plateaus and Teton Basin (12d) and Semiarid Hills and Low

Mountains (80b) ecoregions. Aquatic resources have been degraded by irrigation diversions, channelization, dams, sewage treatment, non-point pollution, food processing, and phosphate processing.

12g—Eastern Snake River Basalt Plains Ecoregion

Ecoregion 12g typically has shallow, stony soils that are unsuitable for cultivation. Only small areas have soils deep enough to be farmed under sprinkler irrigation. Rangeland is widespread and contrasts with the cropland of the Dissected Plateaus and Teton Basin (12d) and Upper Snake River Plain (12e) ecoregions. Potential natural vegetation is mostly sagebrush and bunchgrass. The ecoregion is cool enough to have some regeneration capacity and still contain native plants unlike other ecoregions. The eastern parts of this ecoregion are higher and more continental than the west.

Northern Basin and Range (80) Level IV Ecoregions

80b—Semiarid Hills and Low Mountains

Ecoregion 80b occupies the elevational band above the less rugged Upper Snake River Plain (12e) ecoregion. Potential natural vegetation is mostly sagebrush steppe. Cool season grasses are more common than in drier ecoregions, which have less available moisture and a potential natural vegetation of Great Basin sagebrush. Juniper woodland grows on rock outcrops. Land use is primarily for livestock grazing.

80i—Sagebrush Steppe Valleys

Ecoregion 80i is dominated by sagebrush grassland interspersed with abundant perennial bunchgrasses. Valleys mostly drain to the Snake River and fish are unlike those of the internally-drained basins to the south found in the ecoregions of the Central Basin and Range (13). Grazing is the dominant land use but non-irrigated wheat and barley farming is much more common than in the semiarid basins of the Central Basin and Range (13) ecoregions. The Sagebrush Steppe Valley ecoregion is less suitable for cropland agriculture and has less available water than many parts of the Snake River Plain.

Idaho Batholith (16) Level IV Ecoregions

16d—Dry, Partly Wooded Mountains Ecoregion

Ecoregion 16d is largely underlain by sedimentary and extrusive rocks; granitics are less common than in other parts of the Idaho Batholith. This ecoregion is located in the rain shadow of high mountains and maritime influence is absent. A mosaic of shrubland, open Douglas-fir forest, and aspen occurs and is unlike that seen in other parts of the Idaho Batholith ecoregions.

16f—Foothill Shrublands–Grasslands Ecoregion

Ecoregion 16f lies in the rain shadow of high mountains. This ecoregion's hills and benches are dry, treeless, and covered by shrubs and grasses. Land use in this ecoregion is mostly grazing.

Middle Rockies (17) Level IV Ecoregions

17aa—Dry Intermontane Sagebrush Valleys Ecoregion

Ecoregion 17aa contains stream terraces, floodplains, saline areas, and alluvial fans. Water availability and potential for cropland agriculture are low because the ecoregion is in the rain shadow of high mountains, receives little mountain runoff, and is underlain by highly permeable valley fill deposits. Its deep gravels are unlike the basalts of the Snake River Plain ecoregions. Sagebrush grassland is widespread and contrasts with the open-canopied forests of the more rugged and higher Barren Mountains ecoregion (17e). Shadscale and greasewood grow on alkaline soils that receive less than 8 in. of

precipitation annually. Grazing is the dominant land use. Both the Pashimeroi and Lemhi rivers were once important salmon and steelhead fisheries.

17ab—Dry Gneissic–Schistose–Volcanic Hills Ecoregion

Ecoregion 17ab is shrub and grass covered and is underlain by Quaternary and Tertiary volcanics. The ecoregion is less rugged and drier than the higher Barren Mountains ecoregion (17e) but is more rugged and receives more precipitation than the lower Dry Intermontane Sagebrush Valley (17aa). The Dry Gneissic–Schistose–Volcanic Hills ecoregion's sagebrush–grassland vegetation contrasts with the open-canopied forest–shrubland–grassland mosaic of the Barren Mountains ecoregion (17e). Grazing is the most common land use.

17ap—Sedimentary Subalpine Zone

Ecoregion 17ap is found within the Wyoming parcels of the Upper Snake FO PA, southeast of Yellowstone National Park, in the overthrust belt, and in the northwest corner of the Bighorn Mountains in areas underlain by faulted and folded Mesozoic and Paleozoic sedimentary rocks (limestone, dolomite, shale, and sandstone). Elevations range between 8,500–10,000 ft, and relatively high precipitation amounts, areas of heavy snowpack, and snow with high water content provide enough moisture to support spruce-fir forest on the normally droughty sedimentary substrates. Potential natural vegetation includes subalpine fir and Engelmann spruce with lodgepole pine as a seral species. However, tree growth is limited in fine-grained shale-derived soils, which results in a landscape that alternates between forest groves and open grassy slopes.

17e—Barren Mountains Ecoregion

Ecoregion 17e is largely underlain by quartzite and carbonate-rich rocks and is drier than mountainous ecoregions to the north. Elevations are higher than those of the Dry Gneissic–Schistose–Volcanic Hills ecoregion (17ab) and range from about 6,800–10,000 ft. Open-canopied Douglas-fir, lodgepole pine, subalpine fir forest; aspen groves; sagebrush; and grasses occur. Forests are limited to a narrow elevational band and are most widespread on north-facing slopes. Pacific forest elements are absent and barrens are common.

17g—Mid-elevation Sedimentary Mountains

Ecoregion 17g is located within the Wyoming parcels of the Upper Snake FO PA and includes sections of the Teton and Wyoming ranges, and areas in the overthrust belt underlain by faulted and folded Mesozoic and Paleozoic sedimentary rocks (limestone, dolomite, shale, and sandstone). Stream water quality, water availability, and aquatic biota are affected by carbonate substrates that are soluble and nutrient rich. Soils are generally finer-textured than those found on granitic substrates, and the ecoregion's precipitation levels and soil water-holding capacity provide for some of the largest areas of Douglas-fir in Wyoming.

17h—High Elevation Rockland Alpine Zone Ecoregion

Ecoregion 17h is wet, severely exposed, glaciated and contains jagged peaks, tarns, rockland, and talus deposits. The ecoregion is often snowcapped and maximum annual precipitation is greater than in surrounding, but lower, ecoregions. Soils are stony and have a cryic temperature regime. Alpine tundra, alpine grassland, subirrigated meadows, and wetlands occur above timberline. Krummholz vegetation (i.e., crooked, bent, twisted) occupies windswept areas near timberline. Subalpine fir and whitebark pine are found in glacial cirques.

17j—West Yellowstone Plateau Ecoregion

Ecoregion 17j contains rhyolite and basalt flows, lakes, springs, outwash plains, moraines, canyons, and wetlands. This ecoregion's terrain is generally subdued in contrast to the more mountainous portions of Ecoregion 17, but scattered ridges and buttes do occur. The West Yellowstone Plateau ecoregion has a coniferous forest-shrubland mosaic. Forests dominated by Douglas-fir, lodgepole pine, and aspen are most common on north-facing slopes and flatter uplands. Recreation is a very important land use but mining, grazing, and logging also occur.

17l—Gneissic–Schistose Forested Mountains Ecoregion

Ecoregion 17l is glaciated, wet, and is lithologically unlike nearby ecoregions. Its streams have flashy hydrographs; they experience only a short delay between rainfall and runoff peaks and have low flows during drought and freezing periods. Douglas-fir, lodgepole pine, and subalpine fir are common. Land uses include recreation, logging, and grazing.

17n—Cold Valleys Ecoregion

Ecoregion 17n contains bottomlands, terraces, marshlands, alluvial fans, and foothills that are nestled below the Partly Forested Mountain (17o) ecoregion. Mean annual frost-free season is brief, 40 to 90 days, and shorter than in the Sagebrush Steppe Valleys (80i). Potential natural vegetation is mostly sagebrush steppe. Wet bottomlands support sedges, rushes, and willows. Pastureland, rangelands, and small grain, alfalfa, and potato farming occur. Fields, streams, and marshes are important habitat for both nesting and migratory birds.

17o—Partly Forested Mountain Ecoregion

Ecoregion 17o is steep and dry and varies in elevation from about 6,000 to over 9,000 ft. Soils have a cryic temperature regime and are rocky and shallow. They support open-canopied forests, shrublands, and grasslands; Douglas-fir, lodgepole pine, and aspen are most common on north-facing slopes and gently sloping uplands while mountain big sagebrush dominates south-facing slopes. This ecoregion's vegetation is distinct from surrounding ecoregions and is used as summer range and for timber production.

2.3. Air Resources

The section presents an overview of the current condition of air resources in the Upper Snake PA. Important considerations relating to the current condition of air resources include relevant federal and state regulations and guidelines; climate, climate change, and meteorology; current air quality and areas where standards are exceeded; areas and populations that may be sensitive to air quality; and ongoing and potential activities that may occur on BLM-administered public lands that may impact air quality.

When considering air quality, the Environmental Protection Agency (EPA) generally recommends including an additional 62 miles (mi) range beyond a project or facility boundary or, in this case, an area of consideration (AOC) beyond the Upper Snake PA (EPA 1992). EPA recommends this additional area specifically for air analysis modeling to assure impacts are identified in the immediate area of concern and the surrounding area where impacts could also be reasonably expected. However, this range is a suggestion and may be redefined to accommodate specific needs or concerns associated with a project. To be consistent with EPA's recommendation, the current condition for air resources will be described as the Upper Snake PA (including the airsheds that lie over and within the bounds of the PA) and an AOC of all lands (and airsheds above those lands) that lie within a 62-mi radius of the PA boundary. **Figure A-3, Appendix A–Maps** shows the Upper Snake PA and the AOC (mapping data was not available for Wyoming at the time of publication) for air resources associated with the Upper Snake FO planning effort.

2.3.1. Indicators

Climate

Climate encompasses the statistics of temperature, humidity, atmospheric pressure, wind, rainfall, atmospheric particle count, and numerous other meteorological elements in a given region over long periods of time. The climate of a location is affected by its latitude, terrain, altitude, ice or snow cover, as well as nearby water bodies and their currents. Climate can be contrasted to weather, which is the state of the atmosphere with respect to wind, temperature, cloudiness, moisture, and pressure at a given point in time, for instance daily or within a week or two (National Weather Service [NWS] 2009). Climate is generally defined as the composite, or generally prevailing, weather conditions of a region, throughout the year, averaged over a series of years (NWS 2009). Climate also includes statistics other than the average, such as the magnitudes of day-to-day or year-to-year variations.

Climate Change

Climate change is defined as a non-random change in climate that is measured over several decades or longer (NWS 2009). The change may be due to natural or human-induced causes (NWS 2009). Climate change indicators also include the climate indicators, but with more focus on temperature and precipitation, particularly any changes, trends, and rates of changes/trends with these indicators with time. Issues of concern with respect to climate change include climate variability (which may indicate how climate change may affect resources), trends, and trend rates (which may indicate how human activities and other factors may affect climate).

The Greenhouse Effect and Climate Change

The greenhouse effect is the heating of the surface of a planet as a result of the presence of an atmosphere containing clouds and particles that both absorb and emit infrared radiation. The warmth of the Earth's surface is strongly influenced by the presence of clouds, particles, and greenhouse gases (GHGs), which

act as a partial blanket for the radiation coming from the Earth's surface. This blanketing is known as the natural greenhouse effect. Life on Earth depends on the greenhouse effect. The most important greenhouse gases are water vapor and carbon dioxide (CO_2). The two most abundant constituents of the atmosphere, nitrogen and oxygen, have no such effect (Le Treut et al. 2007).

Ongoing scientific research has identified the potential effects of pollutants considered to be GHG emissions (including carbon monoxide, CO, and CO_2; methane, CH_4; nitrogen oxides, NOx; water vapor; and several trace gasses) on global climate. The Intergovernmental Panel on Climate Change (IPCC 2007) recently stated that most of the observed increase in globally average temperatures since the mid-20th century is very likely as a result of the observed increase in anthropogenic (human-caused) GHG concentrations. Through complex interactions on a regional and global scale, these GHG emissions cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the Earth back into space. The overall increase in world temperatures, which may be caused by additional heat being trapped by GHGs, is called global warming (NWS 2009). Although GHG levels have varied for millennia, with corresponding variations in climatic conditions, recent industrialization and burning of fossil carbon sources have caused CO_2 concentrations (the benchmark GHG emission) to increase, and have been shown to contribute to overall global climatic changes.

Substantial scientific evidence indicates that an increase in the global average temperature of more than 3.6 °F above pre-industrial levels (i.e., those that existed prior to 1860) poses risks to natural systems and human health and well-being (Union of Concerned Scientists [UCS] 2007).

Whether or not the warming phenomena is a natural process, from a geologic time perspective, there is growing momentum to address the human-caused influence to global warming by pursuing reductions in emissions of CO_2 and other heat-trapping gases that cause global warming. The U.S. Congress is considering several bills that propose a variety of global warming emissions reduction targets. The goal of the targets is to avoid the potentially dangerous consequences of temperatures rising more than a global average of 3.6°F (UCS 2007).

Air Quality

The Clean Air Act of 1970 (CAA, 42 U.S.C. 85 §§ 7401 et seq.), as amended, is the comprehensive federal law that regulates air emissions from area, stationary, and mobile sources. It was passed by Congress to protect human health and the environment as well as visibility in sensitive areas. The Idaho Department of Environmental Quality (IDEQ) has the primary responsibility to carry out the requirements of the CAA in Idaho. The 1977 amendments of the CAA clarified that the federal government is subject to CAA requirements. The 1990 CAA amendments required EPA to establish the transportation and general conformity regulations. The Final General Conformity Rule, effective January 31, 1994, applies to non-transportation related federal activities, such as prescribed fire. The CAA authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. Air quality indicators include air pollutant concentration and air quality-related values (AQRVs) such as visibility.

National Ambient Air Quality Standards

The CAA defines the NAAQS as levels of pollutants above which detrimental effects on human health and welfare may result. The EPA established NAAQS for six "criteria" pollutants (EPA 2009). These include CO, nitrogen oxides (e.g., nitrogen dioxide [NO_2]), ozone (O_3), lead (Pb), sulfur oxides (SOx,

e.g., sulfur dioxide [SO_2]), and two categories of particulate matter: fine particulates with an aerodynamic diameter of 10 micrometers or less (PM-10) and fine particulates with an aerodynamic diameter of 2.5 micrometers or less (PM-2.5).

- Carbon monoxide: CO is essentially inert to plants and materials but can have significant effects on human health because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. At low levels, CO can exacerbate cardiovascular disease. At high levels, it can damage the central nervous system. At extremely high levels, CO is poisonous and can cause death. In the U.S as a whole, 56% of CO is emitted by on-road vehicles. CO emissions from on-road vehicles increase to 95% in cities (DOE 2009).
- Nitrogen dioxide: NO_2 can cause damage to respiratory airways. The high diversity, mobility, and reactivity of NO_2 enables this pollutant to contribute to numerous environmental problems such as acid rain, climate change, deteriorated water quality, ground-level ozone, air toxics, and particulate matter. On-road vehicles such as trucks and automobiles are the major sources of nitrogen oxides; however, vehicle manufacturers have been required to reduce nitrogen oxide emissions since the 1970s. Currently, NO_2 is not considered a significant pollution problem in Idaho (Strait et al. 2008).
- Ozone: O_3 is a powerful oxidant that can reduce lung function, aggravate asthma, increase chances for respiratory illness, and lead to permanent lung damage. It can also damage plant tissue, kill plants, and reduce farm yields. Ozone is not a direct emission; it is formed in the air through reactions of NOx, volatile organic compounds (VOCs, e.g., chemicals emitted from paints and lacquers), and atmospheric air in the presence of sunlight (DOE 2009).
- Lead: The primary historical source of lead emissions has been the use of leaded gasoline in motor vehicles, as well as certain industrial sources. Because leaded gasoline has been phased out of use, the processing of metals containing trace amounts of lead is now the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources include waste incinerators, utilities, and lead-acid battery manufacturing plants. The effects of lead exposure include brain and other nervous system damage, and children exposed to lead are especially at risk.
- Sulfur dioxide: SO_2 can aggravate respiratory illness and heart and lung disease. Sulfur dioxide sources are few and localized because these pollutants come primarily from large industrial sources. There is little heavy industry in Idaho and elevated SO_2 concentrations in ambient air are typically not found (Strait et al. 2008).
- Particulate matter: All particles less than PM-10 pose the greatest health concern because they can be inhaled into and accumulate in the respiratory system. Particles less than PM-2.5 are referred to as fine particles. Sources of fine particles include all types of combustion (motor vehicles, power plants, wood burning, etc.) and some industrial processes. Particles with diameters between PM-2.5 and PM-10 are referred to as coarse. Sources of coarse particles include crushing or grinding operations and dust from paved or unpaved roads.
- Both fine and coarse particles are associated with numerous health effects. Coarse particles can aggravate respiratory conditions such as asthma. Exposure to fine particles is associated with several serious health effects, including premature death. Adverse health effects have been associated with exposures to particulate matter over both short periods (such as a day) and longer periods (a year or more). The PM-10 standard has been in effect since 1987 and historically has been the particulate

size of concern. However, PM-2.5 has been monitored in Idaho since 1998 and is now the pollutant of concern. In 2007, there was only one monitoring station for the PA, located in Idaho Falls, for PM-2.5 (IDEQ 2009a).

The EPA assigns classifications to geographic areas with respect to air quality conditions. When an area is considered for classification, there are three possible outcomes of the designation process for each of the criteria pollutants:

- Attainment. Any area that meets the national primary or secondary ambient air quality standard for the pollutant.
- Non-attainment (NAA). Any area that does not meet (or that contributes to ambient air quality in an area that does not meet) the national or secondary standard for the pollutant.
- Unclassified. Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

When an area exceeds an ambient air quality standard, it may be designated as an NAA. It is possible for a geographic area to be an attainment area for one criteria pollutant and an NAA for another. Air monitoring networks determine whether an area meets the ambient air quality standard. If an area falls into NAA status, the IDEQ is required to prepare a state implementation plan to describe how the area will be brought into attainment. Attainment areas are further classified as Class I, II, or III and are subject to the prevention of significant deterioration (PSD) program.

There are numerous other air pollutants in the atmosphere that generally fall into the category of non-criteria pollutants (e.g., total organic gases, VOCs, total hydrocarbons, methane, and air toxics), but their use as air quality indicators involves a case-by-case evaluation of the pollutant and its specific impact on the human and natural environment of the area.

Prevention of Significant Deterioration

The CAA also establishes a national goal of preventing any further degradation or impairment of visibility within federally designated attainment areas. There are different permissible increments for criteria pollutants for different areas, or classes. The classes are defined as follows:

- Class I. These areas include international parks, national wilderness areas (larger than 5,000 acres), national memorial parks (larger than 5,000 acres), and national parks (larger than 6,000 acres), which were in existence on August 7, 1977. Class I areas afford the highest protection to air quality by restricting the level of further degradation allowed.
- Class II. Attainment areas that do not meet Class I or Class III designations.
- Class III. This class is assigned to attainment areas to allow maximum industrial growth while maintaining compliance with NAAQS.

Air Quality Index

The air quality index (AQI) is reported according to a 500-point scale for each of the major criteria air pollutants, with the worst denominator determining the ranking. For example, if an area has a CO value of 132 on a given day and all other pollutants are below 50, the AQI for that day would be 132. The AQI scale breaks down into six categories: good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy and hazardous. The AQI is a national index, the air quality rating and the associated level of

health concern is the same everywhere in the country. The AQI is an important indicator for populations sensitive to air quality changes.

Air Quality-Related Values

Visibility is generally described as the maximum distance that an observer can see a landscape viewed against the background sky. It also refers to the clarity with which the texture, form, color, and details of the landscape appear. Visibility is how far we see and how clear the view appears. Visibility impairment is one of the most obvious indicators of pollution in the air. Air pollution can cause light to be absorbed or scattered, thereby affecting the image we see. The pollution and resulting changes in light are referred to as "haze." In Idaho, most haze is a result of smoke from fires, and dust. Depending on the source(s) of the haze, it may be localized or transported into the area by wind.

In addition to the further degradation limits applied to Class I areas through the PSD program, the 1999 amendments to the CAA set forth a national goal for visibility. The rule, referred to as the Regional Haze Rule, calls for states to establish goals and emission reduction strategies for improving visibility in all Class I national parks and wilderness areas.

2.3.2. Current Conditions

Climate

The Upper Snake PA displays a more continental climate than that of the western and northern portions of the state. This is apparent in not only the somewhat greater range between winter and summer temperatures, but also in the reversal of the wet winter–dry summer pattern. The semiarid climate of the area yields annual precipitation ranging from a little over 10 in. at lower elevations and up to 21 in. in the highlands and mountains, with a majority of the precipitation occurring in the winter and spring months. Summer precipitation is light and infrequent, and usually comes in the form of afternoon thundershowers brought on by the influx of moisture-laden air from the Gulf of Mexico and the Caribbean region. Annual temperatures vary from highs of about 88ºF to lows of 11ºF in the Snake River Plain, to highs of 79ºF and lows of 3ºF in the highlands. Winds within the Snake River Plain are usually from the south and south west, light and variable, and largely result from the daily heating and cooling of land surfaces. The strongest winds generally are associated with weather fronts and the thunderstorms that occur in spring and summer. These events are generally limited in duration, but 40–60 mile per hour (mph) gusts are possible. Strong winds and blowing soil/dust occur more often in spring prior to agriculture planting and in late summer/fall after harvest. Wind erosion can be severe at these times and the problem can be compounded if farmers have burned their crop residue, a common practice to improve yields, reduce the need for herbicides and pesticides, minimize fire hazards, and control disease, weeds, and pests. Blowing soil and dust has been severe enough to close major roadways. During the summer, air quality can be adversely affected by the occasional dust storm and wildfires.

Seasonally, winter temperatures can be well below 0°F, especially when influenced by northern Canadian air flows, but frequent southwest winds can moderate cold winter conditions. Spring and fall temperatures can vary widely, with daytime temperatures typically ranging between 30–70°F. Summer temperatures frequently rise into the 90°F range, but long periods of extremely hot weather are not common. Summer night temperatures frequently drop into the 50–60°F range. The growing season (freeze-free duration) is about 125 days and shorter in other higher elevation areas, including the eastern valleys.

Climate Change

Global mean surface temperatures have increased nearly 1.8°F from 1890 to 2006 (Goddard Institute for Space Studies [GISS] 2007). However, both observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. The GISS (2007) data indicated that northern latitudes (above 24° N) have exhibited temperature increases of nearly 2.1°F since 1900, with nearly a 1.8°F increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change in climatic conditions, but increasing concentrations of GHG are likely to accelerate the rate of climate change. The GISS indicated that by the year 2100, global average surface temperatures will rise 2.5–10.4°F above 1990 levels (GISS 2007). The National Academy of Sciences (2008) has confirmed these findings, but also indicated there are uncertainties how climate change will affect different regions. Computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be higher than during the summer.

Globally, calendar year 2008 was the coolest year since a 2000 analysis of surface air temperature measurements, but the 9th warmest year in the period of instrumental measurements, which extends back to 1880 (GISS 2009). The ten warmest years have all occured within the 12-year period 1997–2008. The two-standard-deviation (95% confidence) uncertainty in comparing recent years is estimated as 0.9°F, so it can be concluded with confidence that 2008 was between the 7th and 10th warmest year on record.

Increasing GHGs continue to be a dominant factor affecting interannual and decadal temperature change. Given the GISS's expectation of the next El Niño beginning in 2009 or 2010, it still seems likely that a new global temperature record will be set within the next 1–2 years.

According to the *Idaho Greenhouse Gas Inventory and Reference Case Projections* (Strait et al. 2008), preliminary analyses suggest that:

- In 2005, activities in Idaho accounted for approximately 37M metric tons of CO_2 equivalent emissions, an amount equal to about 0.5% of total U.S. GHG emissions (based on 2004 U.S. emissions).
- Transportation and agriculture are Idaho's principle GHG emissions sources, accounting for 51% of Idaho's gross GHG emissions in 2000.
- The use of fossil fuels—natural gas, oil products, and coal—in the residential, commercial, and industrial sectors constituted another 19% of total Idaho emissions.
- The combustion of fossil fuels for electricity generation (including emissions associated with the generation of electricity imported from other states) constituted only 13% of total Idaho emissions, which is a little less than the Nation as a whole.
- Forestland emissions refer to the net CO_2 flux (both emissions of CO_2 to the atmosphere and removal [sinks] of CO_2) from forested lands in Idaho, which account for about 41% of the Idaho's land area. Based on USFS data, Idaho's forests are estimated to be a net source of CO_2 emissions accounting for about 10% of Idaho's total gross GHG emissions in 2000.

BLM Activities

BLM activities and air resources management are guided, among other BLM policies, through BLM Manual, 7300, Air Resource Management (BLM 2009a). This manual sets forth the authority, policy,

objectives, program structure, roles and responsibilities for the BLM air resource management program. The manual addresses multiple-use management responsibilities under FLPMA, and responsibilities under other authorities, including the CAA, that impact BLM's management of air resources on the public lands.

BLM is addressing the issue of climate change:

> *The climate is both a driving force and a limiting factor for biological, ecological, and hydrological processes. For example, the intensity and duration of sunlight and moisture affects flora and fauna composition, species, size, distribution, and structure. Therefore, the climate may impact resource management activities, such as disturbed site reclamation, wildland fire management, drought management, mineral resource development, management of rangeland and watershed productivity, and wildlife habitat administration. These resource management activities may, in turn, impact the climate. Because the climate has great potential to influence renewable and non-renewable resource management (affecting the productivity and success of many BLM activities), incorporating climatic information into the BLM's programs, projects, activities, and decisions, all of which authorize use of the public lands, is critical for effective management and relevant for environmental review.* (BLM 2009a)

Certain BLM-authorized activities within the PA would produce pollutants considered to be GHGs, particularly CO_2. For example, oil and gas development, construction activities, vehicle travel, and the use of motorized tools and prescribed burning for vegetation and wildlife habitat manipulation generate CO_2 and CH_4. These activities contribute to GHG primarily through carbon emissions (Zahniser, Cossa, and Stewart 2009). Other activities occurring on public lands that may generate criteria pollutants or particulate matter and affect air quality include mining and mineral processing (e.g., crushing or hot mix operations), forestry, construction, motorized travel, OHV use, and recreation activities (e.g., camp fires). Activities, programs, and projects initiated by BLM, as well as operator-initiated activities and projects the BLM authorizes, have the potential to affect and/or be affected by the climate and climate change. However, some authorized activities may help sequester carbon, such as maintaining vegetative and forested cover, which may help build organic carbon in soils and function as carbon sinks.

Of the six air pollutants, particulate matter has the most concern to the BLM in authorizing activities involving smoke emissions and dust. The majority of particulate matter from smoke emissions is composed of organic and elemental carbon, and inorganic ash in the PM-2.5 size class.

In 2008, the National Science Foundation granted $15M to the University of Idaho, Idaho State University (ISU), and Boise State University to study climate change in the Snake and Salmon River watersheds to learn how climate change is affecting water availability, land use, economic production, urban growth, water management and water rights, along with fire, insects, ecology, fisheries and changing landscapes (Russell 2008). The results of the 5-year study of the Snake River watershed will be useful in furthering the Upper Snake FO's understanding of climate change.

Air Quality

Criteria Pollutants

In Idaho, monitoring for the criteria pollutants occurs primarily in areas of high population where the potential for human exposure is greatest. Particulate matter is currently the most common criteria pollutant of concern in Idaho because particulate sources are widespread throughout the state.

The current condition for criteria pollutants (IDEQ 2007a, the last year for which a monitoring report is available) can be described as follows:

- Carbon monoxide: Idaho currently only monitors CO in Boise, where it was identified as a non-attainment area, and later reclassified to a maintenance area. There are no non-attainment areas within the PA for CO.
- Nitrogen dioxide: Observed averages statewide have consistently been well below the NAAQS annual standard. IDEQ maintains three monitoring sites for NO_2; none of which are located within the PA or the AOC.
- Ozone: Ozone needs heat and sunlight to form; thus, it is considered a summertime problem and is only monitored from May 1 through September 30. The only area in Idaho approaching the federal standard for ozone is in Twin Falls, which is outside the AOC.
- Lead: Lead has not been monitored in Idaho since 2002. With the phase-out of lead in automobile fuel, and no facilities or operations that contribute lead to the atmosphere, lead is not considered a public health concern in Idaho. To comply with federal law, there are future plans to monitor non-source lead in the future (IDEQ 2009a).
- Sulfur dioxide: Idaho was well below the state and federal standards for SO_2, including within the PA. There are isolated locations within the AOC being monitored for SO_2, near industries in Soda Springs and Pocatello.
- Particulate matter: There are no non-attainment areas within the PA identified by the IDEQ (2007a,b) for PM-10 or PM-2.5. PM-2.5 is monitored in the PA in Idaho Falls. There are two locations within the AOC being monitored for PM-2.5, Salmon and Pocatello. The entire state was considered categorized as "in attainment" for PM-2.5 (note Cassia Valley, next section).

Non-attainment areas for criteria pollutants within the AOC, in Idaho, as of 2007 (IDEQ 2007a, the last year for which a monitoring report is available) are:

- Cache Valley. There are only 2 years of data for Franklin County (located at the southern end of the AOC), but it was designated as a non-attainment area because the valley is located within the same airshed as Logan, Utah, which violated the 24-hr NAAQS for PM-2.5.
- Portneuf Valley. The Portneuf Valley is a maintenance area for PM-10. Formerly this area was known as the Power/Bannock County PM-10 area and later split into the Portneuf Valley and federal Fort Hall PM-10 areas.

PSD

The CAA addresses visibility protection for Class I areas. A small section (approximately 36,000 acres) of Yellowstone National Park resides in the PA as a Class I area. The following Class I areas lie, wholly or partially, within the AOC. All other areas within the PA and AOC are Class II.

- Craters of the Moon National Monument and Preserve (Idaho)
- Yellowstone National Park, Grand Teton National Park (Wyoming)
- Red Rock Lake Wilderness (Montana), Sawtooth Wildnerss Area (Idaho)
- North Absaroka Wilderness, Teton Wilderness, Washakie Wilderness, and the Bridger Wilderness (Wyoming).

The BLM is required to consult and coordinate with applicable regulatory agencies on the management of existing and future PSD increment consumption to provide for the protection of air quality while accomplishing the BLM core mission (BLM 2009a).

Airsheds

The state of Idaho has been divided into sixteen airsheds. The PA is located within all or portions of five airsheds including 17, 18, 19, 20, and 24. The majority of the PA falls within airsheds 17, 18, 19, and only small portions are found in 20 and 24. The AOC extends into two airsheds in Utah (1, 4); airsheds 7, 8a, 8b, and 10 in Montana; and 16, 21, and portions of 24 and 25 in Idaho. Airshed data for Wyoming was not available at publication. The airsheds are shown on **Figure A-3, Appendix A–Maps**.

Impact Zones

Impact zones are areas where smoke is likely to be a problem because of local topography, meteorology, or other factors or where existing air quality problems could be exacerbated by smoke. IDEQ considers impact zones to be smoke sensitive and the zones are given additional air quality protection as needed. There are ten impact zones in Idaho. One impact zone lies in the PA, Idaho Falls; two lie within the AOC, Sun Valley, Idaho, and Big Sky, Montana; and part of one impact zone, Salmon, Idaho, lies partially within the AOC.

Sensitive Areas

Areas that would be identified as sensitive to air quality would include NAAQS non-attainment areas, impact zones, and Class I areas. Sensitive areas also include places where sensitive populations are located. Sensitive populations to air quality generally include children, the elderly, those with existing health conditions, and people who have high exposure (those who work, exercise, or spend extensive time outdoors). As such, sensitive areas also include schools while in session, nursing homes and assisted living centers, hospitals, and medical centers. **Figure A-3, Appendix A–Maps**, shows sensitive populations in the PA and throughout the AOC.

In addition to impact zones, sensitive areas may also include locations where emissions may be concentrated such as along transportation corridors or at airports. The major transportation corridors within the PA and AOC are Interstates 15, 84, and 86; U.S. Highways 20, 26, 30, 89, 91, 93, 189, and 191; and State Highways 33 and 75. Airports within the PA and AOC that are large enough to be considered possible sensitive areas include: Fanning Field (Idaho Falls), Friedman Memorial Airport (Sun Valley), McCarley Airport (Blackfoot), and Pocatello Regional Airport (Pocatello). Summary information for the airsheds and sensitive populations in the PA is shown in **Table 2-2**. Summary information for sensitive populations outside the PA and within the AOC is shown in **Table 2-3**.

Alerting Sensitive Populations

The National Oceanic and Atmospheric Administration (NOAA), in partnership with EPA, issues daily air quality forecast guidance as part of a national air quality forecasting capability. The goal of the air quality program is to provide the U.S. with ozone, particulate matter, and other pollutant forecasts with enough accuracy and advance notice to allow people to limit harmful effects of poor air quality, saving lives and reducing the number of air quality-related asthma attacks; eye, nose, and throat irritation; heart attacks; and other respiratory and cardiovascular problems.

NOAA's NWS currently provides forecast guidance for ozone and smoke based on numerical atmospheric predictions updated twice daily. Predictions provide information for people in cities, suburbs, and rural areas alike, at hourly intervals through midnight the next day.

The EPA works with state and local air quality agencies, as well as the private sector, to gather air quality data and interpret its health impacts with a national network for air quality monitoring and a national inventory of emissions data. This data is provided to NOAA for its forecasting capability. State and local air quality agencies use this guidance to issue air quality forecasts and AQI predictions for approximately 300 participating communities across the U.S. Typically these take the form of an alert level issued for the next day, based on expected worst-case air quality. The private sector uses and disseminates this information to the public as well.

Air Quality Index

The number of "good" air quality days continues to dominate regionally in Idaho, including within the PA. The absence of any major industrial sources of air pollution in the vicinity further supports this statement. Although moderate amounts of suspended particulate matter from residential wood combustion, automobile exhaust, agricultural activities, fugitive road dust, and open burning exist, the nonrestricted airsheds within the area allow for most of the particulate matter to be dispersed rather than contained within the valleys.

Table 2-2. Airshed information and sensitive areas located within the PA.

Airshed Number	Total Acres	Panning Area Acres (%)	County	Percent County in Airshed	Sensitive Populations in the Planning Area Boundary[a]	
					Medical Facilities	Schools
17	4,500,099	325,055 (7.22)	Butte	60.3	–	–
			Clark	23.9		
			Custer	14.3		
			Jefferson	0.2		
			Lemhi	1.4		
18	2,271,076	261,954 (11.53)	Bonneville	2.8	–	11
			Clark	75.4		
			Fremont	18.8		
			Jefferson	0.1		
			Teton	2.9		
19	5,007,471	1,207,474 (24.11)	Bingham	21.5	7	124
			Blaine	7.7		
			Bonneville	5.9		
			Butte	25.0		

Airshed Number	Total Acres	Panning Area Acres (%)	County	Percent County in Airshed	Sensitive Populations in the Planning Area Boundary[a]	
					Medical Facilities	Schools
			Clark	5.1		
			Custer	3.4		
			Fremont	8.1		
			Jefferson	16.0		
			Madison	1.3		
			Power	5.9		
20	4,461,245	11,775 (0.26)	Bingham	0.1	–	4
			Bonneville	99.9		
24	984,019	1,536 (0.16)	Blaine	10.9	–	–
			Butte	89.1		

a. Source: Idaho data came from Geographic Names Information System (GNIS) in 2009, Wyoming and Montana data was extracted from GNIS 2004. No information was available for nursing homes and assisted living centers.

Air Quality-Related Values

The CAA's Regional Haze Rule requires states to set "Reasonable Progress Goals" toward improving visibility in the nation's national parks and wilderness areas. The goal envisioned by the drafters of the Regional Haze Rule is that visibility in Class I areas will return to natural conditions within 60 years. Without haze, the natural visual range would be approximately 140 mi in the western U.S. The rule requires states to develop 10-year plans to demonstrate progress toward that goal. Idaho will be setting reasonable progress goals to improve and protect primarily by addressing the three major haze-causing pollutants, nitrogen oxides, particulate matter, and sulfur dioxide. There are two Class I areas within the AOC for which visibility data are available.

Table 2-3. Sensitive areas in the area of consideration, outside of the PA, by airshed.

Airshed	State	Sensitive Populations[a] Area of Consideration		Airshed	State	Sensitive Populations[a] Area of Consideration	
		Hospitals and Medical Facilities	Schools			Hospitals and Medical Facilities	Schools
7	Montana	2	20	18	Idaho	–	–
8A	Montana	1	5	19	Idaho	4	42
8b	Montana	–	7	20	Idaho	–	38
–[b]	Wyoming	4	8	24	Idaho	1	12
17	Idaho	–	8	–	–	–	–

a. Source: Idaho data came from Geographic Names Information System (GNIS) in 2009, Wyoming and Montana data was extracted from GNIS 2004. No information was available for nursing homes and assisted living centers.

b. No airshed information was available from Wyoming at the time of publication.

- Craters of the Moon National Monument and Preserve: Data comparing the best and worst visibility days at Craters of the Moon show poor visibility most often occurs in the winter; when air stagnation events create inversions, conditions cause pollutant levels to rise. During these episodes, visibility is impacted by higher levels of nitrates and sulfates, which contribute to the formation of fine particulates. In the summer, visibility impairment occurs less frequently. Visibility impairment in the summertime results from higher levels of organic matter, usually attributed to wildland fires. Visibility data for Craters of the Moon National Monument from 2001 through 2004 show that mean annual visual range varied from 150–180 mi on clear days to 100–110 mi on average days, to 60–70 mi on hazy days.
- Yellowstone National Park: The park is remote from any major source regions. The nearest population centers within the AOC are Idaho Falls and Pocatello, Idaho, and Butte and Helena, Montana. Nearby emission sources may include smoke from natural and anthropogenic burning. Visibility data for Yellowstone National Park from 1997 through 2004 show that mean annual visual range varied from 170–180 mi on clear days, to 120–130 mi on average days, to 70–90 mi on hazy days.

Wildland and Prescribed Fire Smoke Management

Wildland fires and prescribed burning produce O_3, CO, and particulate matter from burning vegetation. These emissions with certain meteorological conditions may affect large areas for extended periods of time; however, generally impacts are short-term, localized, and seasonal. Prescribed burns and controlled wildfires may be instrumental in minimizing, or limiting, overall hazardous particulate matter concentrations as they reduce fuel load accumulation that can subsequently result in intense, long-duration, uncontrolled wildland fires.

EPA, in cooperation with federal land managers, states and tribes, issued the Interim Air Quality Policy on Wildland and Prescribed Fires (EPA 1998). One of the goals of the policy is to allow fire to function as a disturbance process on federally managed wildlands, while protecting public health and welfare.

Under the EPA's Natural Events Policy (EPA 1996), the EPA may exercise its discretion to not designate an area as non-attainment if high PM-10 concentrations are attributed to wildland fire. However, in response to the extensive wildland fire events of 2000, IDEQ completed the Wildfire Natural Events Action Plan to address air quality and public health impacts caused by natural wildfire events (IDEQ 2002).

The Montana/Idaho Airshed Group (M/IAG) is composed of state, federal, tribal and private member organizations who are dedicated to the preservation of air quality in Montana and Idaho. Its members work cooperatively to regulate burning to prevent smoke impacts while using fire to accomplish land management objectives. The Upper Snake PA is located within the South Idaho Airshed Unit of the M/IAG.

Smoke emissions from forest and range prescribed burning are managed by the M/IAG under the Montana/Idaho Airshed Group Operating Guide (M/IAG 2008), which is updated annually. The smoke management unit located in Missoula, Montana, coordinates prescribed burning activities of state, federal, tribal and private member organizations. Burn plans written under the M/IAG smoke management program must include actions to minimize fire emissions, a smoke dispersion evaluation, public notification, exposure reduction procedures, and an air quality monitoring plan. The M/IAG smoke

management unit issues daily decisions which can restrict burning when atmospheric conditions are not conducive to good smoke dispersion to further protect sensitive and Class I areas.

Crop Burning and Management

Private agriculture lands are interspersed throughout the PA and the AOC. The EPA approved the IDEQ's crop residue burning (CRB) program in September 2008. The program resulted from a legal action which challenged that Idaho had not met all requirements of the federal CAA when allowing field burning under Idaho rules. The goals of the program are to be protective of public health, transparent to the public, and restore the use of fire as a tool for agricultural community. Growers are required to obtain permission to burn crop residues through an on-line registration system and take CRB training. Air quality is protected by the program's air quality limits for both short-term and longer term exposures to PM-2.5 and O_3, as measured by monitors installed specifically for this program (IDEQ 2009b). The IDEQ is a member of the M/IAG and the CRB program is coordinated under the M/IAG's smoke management program.

2.3.3. Trends

Climate and Climate Change

How climate change will impact BLM resources specifically is mostly dependent upon the location of the affected resource, and how the affected resource further affects associated resource uses and the human environment. There will be positive and negative impacts of climate change, even within a single region. For example, warmer temperatures may bring longer growing seasons in some regions, benefiting those farmers who can adapt to the new conditions but potentially harming native plant and animal species. In general, the larger and faster the changes in climate are, the more difficult it will be for human and natural systems to adapt.

The current state of climate science prevents the association of specific actions with specific climate-related effects, so currently it is not possible to analyze the climate-related effects of BLM actions or ascribe any significance to these potential effects (Zahniser, Cossa, and Stewart 2009).

However, an attempt can be made to account for and disclose the contributions to, or mitigation of, climate change; compare those contributions/mitigation to other relevant climate drivers; and discuss the relationship between causes and effects of climate change.

In general, the PA could experience some measure of changes mirroring these global predictions:

- most warming over land and at the highest northern latitudes, and least over the Southern Ocean and parts of the North Atlantic,
- contraction of the area covered by snow,
- increases in the frequency of extremes of heat, heat waves, and heavy precipitation,
- a likely increase in tropical cyclone intensity,
- a shift towards the poles of storms outside the tropics, and
- increases in precipitation in high latitudes, and likely decreases in most sub-tropical land regions (United Nations Environment Programme 2009).

Based on these current assumptions for climate change, the PA and the AOC could see effects to water quantity, quality, and seasonal availability; agriculture and grazing; disease and pests outbreaks; shifting of seasons; shifts in plant and animal population, range, species diversity, and migration patterns; forest(s) quality; and frequency, duration, and location of extreme weather events. Snow season would be decreased and winter runoff rate increased, making too much moisture available in early season. Without sufficient rains after the runoff period, there may not be enough moisture to make it through a regular growing season; therefore, growing seasons for agriculture and vegetation in general, could become shorter. Within the PA itself, and AOC, there may be local variations, for instance, it may be drier in the southern areas, and wetter in the northern and eastern areas.

Some impacts to PA resources that could be experienced with climate change could include the following (Zahniser, Cossa, and Stewart 2009):

- Soils could see net increases in soil moisture and increases in landslides and erosion, or net decreases in moisture, decreases in soil productivity, and increases in wind erosion.
- Fish could be stressed from premature snow melt, which could result in changes in species composition, reproduction timing, and survival rates.
- Forests could exhibit changes in fire frequency, species mix, productivity, and disease rate.
- Water surface flows could be altered, as could be flow timing, turbidity, and plant evapotranspiration rates.
- Excessive winter runoff and flooding and subsequent summer water shortages could be experienced. Summer water shortages could be tempered by spring storms, but heavy spring precipitation could lead to more flooding, without increasing overall water availability.

Some examples of impacts to resource uses in the PA that could be experienced with climate change could include the following (Zahniser, Cossa, and Stewart 2009):

- With increased early season moisture, species composition could be altered. There could be increased heat stress for livestock later in the season, decreased forage availability, and shorter or disrupted grazing seasons.
- Changes in weather patterns and increases in frequency of extreme weather events could change and/or disrupt recreation and tourism seasons. Overall recreation seasons could be shorter, disrupted, or shifted.
- With increased early season moisture, forest understories could increase in volume; dry out in later season, and fuel more intensive fires in the PA's forests.

Air Quality and Air Quality-Related Values

Monitoring of suspended PM-10 and PM-2.5 concentrations has shown decreases throughout Idaho, including the PA. The AQI remains good for Idaho, the PA, and the AOC. There are no indications of, or trends for, other criteria pollutants declining or leading air quality in an adverse direction from current good conditions.

Visibility in Class I areas could be degraded by an increase in local PM-2.5 emissions and/or local or regional NOx emissions. Visibility could be improved by implementation of measures required by EPA

through the Regional Haze Rule. Visibility is a sensitive indicator, which means that small changes in concentrations of visibility-impairing pollutants could affect visibility.

Regardless, there is always the potential for air quality to trend away from desired conditions as a result of increases in commercial and industrial development, recreation activities (including OHV use), and wildland fires. Still, there is no current data or observations of rapid growth in development to indicate a trend in an adverse direction for the PA's air quality.

BLM Activities
BLM continues to consider the potential effects of BLM projects, programs, activities, and BLM-authorized activities on air quality at both the planning and the project level. This includes evaluating the potential impacts, if appropriate, of proposed actions and activities such as: grazing management, hazardous materials management, land use authorizations, smoke management, drought management, wilderness management, energy and mineral resource development, recreational uses, and transportation management (BLM 2009a).

2.3.4. Forecast

Climate and Climate Change
The IPCC (2007) recently concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentration." The current condition of the PA as presented in this document could be very different in the future, not as a result of the land use planning process, or implementation actions that follow an approved RMP, but as a result of climate change itself to the "current condition" of the PA.

In 2007, a climate change task force was created within the DOI to study climate change and its effects on the responsibilities of the Department, including BLM. The task force is developing options for actions DOI should consider with respect to legal and policy issues, land and water management issues, and climate change scientific issues specifically related to DOI's responsibilities. Additionally, the DOI Secretary outlined considerations and practices in concert with task force subcommittees' findings to plan and manage for climate change, carbon sequestration, and energy conservation (Kempthorn 2009) with a focus on preventing GHG emissions, and implementing mitigation and adaptation activities. A few recommendations specific to air quality include the following:

- Using incentives for activities to encourage the sequestration of GHG emissions, including CO_2.
- Use existing policies and regulations, programs, and expertise to work with private landowners and GHG emitters to identify opportunities to restore habitat while helping to offset GHG emissions.

Potential management options that could be considered (Zahniser, Cossa, and Stewart 2009) to respond to climate change and GHG emission activities during the land use planning process include:

- managing from a watershed and ecosystem scale,
- planting new biomass afforestation/reforestation/restoration,
- preserving existing biomass,

- conserving soil organic matter,
- avoiding overgrazing,
- restoring soils and degraded land, and
- improving management of forest resources.

At this time, it is difficult-to-impossible to evaluate how a specific management action can result in a specific climate change impact, because climate change is not, in and of itself, an environmental impact; climate change causes environmental impacts. However, it is possible, and reasonable, to analyze actions in an aggregate fashion, by activity type and resource/use, in the context of the way climate change is affecting, and will continue to affect, the PA itself.

Air Quality and Air Quality-Related Values

While no discernable trend towards degradation of air quality is present, degradation of air quality could emerge over time as a result of increases in pollutants from commercial operations, recreational use, and wildland fires. However, these impacts are typically localized and seasonal, minimizing the overall amount of expected degradation. Mitigating factors may also play a key role; for example, paving roadways that are currently unpaved, replacing older motor vehicles and industrial equipment with newer cleaner ones, and improving the ability to permit, monitor, and control sources of air pollution may ultimately prevent such degradation from occurring. The likelihood is that the PA will continue to remain rural, and expected growth is anticipated to be slow. It is unlikely that future high density commercial operations would occur.

BLM Activities

Activities, programs, and projects initiated by BLM, as well as activities and projects the BLM authorizes, have the potential to affect and/or be affected by climate and climate change. BLM will consider the role of climate and weather information and potential or documented climate change to proposed actions and authorized activities, and its planning process (BLM 2009a).

The IDEQ air quality permit process and BLM wildfire and prescribed fire programs, plans, and policies have been and, at this time, continue to be the foundation for controlling the degradation of air quality within the PA, the AOC, and to sensitive populations and Class I areas.

2.3.5. Key Features

Key features of the PA and the AOC are the Class I areas, impact areas, non-attainment areas, sensitive areas and populations, and the relatively good overall condition of air resources.

2.4. Geology/Paleontological Resources

A variety of mineral and paleontological resource, unique landforms, geomorphic features, and geologic hazards characterize the Upper Snake PA.

2.4.1. Indicators

Mineral Resources
The indicators that describe resource condition for mineral resources are the following:

- number of minerals actions authorized and pending,
- number of active, unpatented mining claims filed,
- tons or cubic yards of mineral commodities produced,
- number of acres open, restricted, and closed to locatable, leasable, and saleable mineral exploration or development, and
- number of acres of no surface occupancy (NSO) restrictions for oil and gas
    - NSO acres – areas with low oil and gas potential
    - NSO acres – areas with moderate oil and gas potential
    - NSO acres – areas with high oil and gas potential.

Sources of data for the indicators include the following:

- BLM mineral potential and mining claim validity reports,
- LR2000 (Land and Mineral Legacy Rehost 2000 System)[1] public data and reports on number of mining claims, mining notices and plans of operation, geothermal and oil and gas lease applications, and mineral material disposals,
- BLM field compliance inspection reports and observations,
- professional geologic papers and published geologic reports and maps,
- United States Geological Survey (USGS) and U.S. Bureau of Mines (USBM)[2] mineral and technical reports and statistics,
- State of Idaho reports and statistics,
- mining industry-provided exploration, mining, and production data, and
- social and economic indicators, including market values for precious metals, energy minerals, sand and gravel and rock products, and other commodities.

Unique Landforms
Indicators that describe unique landform condition include subjective criteria such as public interest and visitor use, interpretive value, and educational or research value.

[1] LR2000 is a searchable database for public reports on land and mineral use authorizations, conveyances, mining claims, withdrawals and classifications and can be accessed via: http://www.blm.gov/lr2000/about.htm.

[2] In September 1995, Congress closed the Bureau of Mines and transfered its functions to other federal agencies.

Geologic Hazards
Indicators include recorded or estimated magnitudes of earthquakes and the frequency of those earthquakes, landslides, mudslides, and floods.

Paleontological Resources
Resource condition is assessed by field observations, paleontological reports, commercial site reports, and project review. The factors that describe resource condition for paleontological resources are the following:

- Loss of Fossils: Natural weathering, decay, erosion, intensive recreation use, and vandalism can remove fossils from parent material. This can lead to loss or destructions of fossils.
- Modification of Physical Relationships: Scientific study of paleontological resources is often related to accuracy of the vertical and horizontal measurements among elements of the site. Displacement of original physical relationships reduces the reliability, or may completely negate, the significance of measurements needed to reconstruct the activities and sequence of events at a paleontological site.
- Modifications of Characteristics: Paleontological resources may be affected by processes of decay, leaching, chemical exposure, and accelerated weathering.

Sources of data that may be used to identify these resources include BLM inventories and contracts, geologic maps of favorable rock units, exploration and quarrying sites, and research reports.

2.4.2. Current Condition

The Upper Snake FO encompasses portions of four of the major physiographic provinces (Thornbury 1965) of the western U.S. The northern margin of the FO is bounded by the Beaverhead, Centennial, and Henry's Lake mountain ranges of the Northern Rocky Mountain Physiographic Province. On the eastern and southeastern margin of the FO lie the Teton, Caribou, and Snake River ranges of the Middle Rocky Mountain Physiographic Province. On the west and northwestern margin lie the Pioneer, Big Lost, and Lemhi ranges of the Basin and Range Physiographic Province.

These mountain ranges surround the eastern Snake River Plain (ESRP), the eastern most extension of the Columbia Intermontane Physiographic Province. The Snake River Plain consists of a 40–60 mi wide trough of volcanic rocks that extends from Yellowstone National Park to eastern Oregon, a distance of more than 400 mi.

The mountain ranges of the Northern and Middle Rocky Mountain Physiographic Provinces are part of the zone of structurally disturbed strata that form a mountain system that extends from northern Alaska to Central America. The mountains along the eastern and northern edge of the Upper Snake FO include metamorphic and sedimentary rock sequences that range in age from Precambrian to Mesozoic and have been uplifted, faulted, and folded. The mountains of the Basin and Range Physiographic Province are typical of the north-south trending ranges of the Basin and Range that resulted from the stretching and thinning of the Earth's crust in the western U.S. These ranges consist of Tertiary lava flows and interbedded pyroclastic rocks as well as Paleozoic sedimentary rocks, which have also been faulted and folded, and in some areas, hydrothermally altered.

The volcanic rocks of the ESRP consist of a sequence of rhyolite flows capped by undissected Quaternary basalt flows that have a thickness of 5000–6000 ft. Volcanic cinders, scoria, and slaggy fragments are found near the numerous vents and craters that are present on the ESRP. Quaternary deposits that cover the basalts consist of stream terrace and channel deposits as well as flood plain deposits and windblown sediments.

Minerals

The production of locatable, leasable, and salable minerals is not currently a significant component of the local or regional economy of the Upper Snake FO. However, a number of mineral commodities have been and are currently being produced. One of two precious opal deposits found in the U.S. is located east of Spencer, Idaho, along the northern boundary of the FO. Two mines currently produce and sell precious fire opal. Deposits of industrial-grade limestone, travertine, building stone, pumice, and low grade bentonite deposits are also being produced in the FO. Deposits of sand and gravel are important sources of aggregate that are being developed to build and maintain the many miles of federal, state, and county roads that are found throughout the FO. There is also a greater demand for aggregate materials as the towns and cities throughout the FO continue to grow.

Unique Landforms

The BLM has designated three areas within the FO as ACECs/RNAs based on their geological significance: the North Menan Butte ACEC/RNA, the St. Anthony Sand Dunes RNA, and the China Cup Butte RNA. The BLM has not identified any unique landforms under the Geologic Heritage Initiative of 1998.

Geologic Hazards

The State of Idaho does not currently operate an earthquake information center that compiles data collected from seismic networks in the state. The University of Utah Seismic Center in Salt Lake City, Utah, in cooperation with the USGS, operates an extensive seismic network throughout northern Utah, the mountain ranges of the Middle Rocky Mountain Physiographic province (the Teton, Caribou, and Snake River ranges), and the Yellowstone National Park area. The INL also operates a network of 27 seismic stations within and surrounding the INL. In addition, Brigham Young University (BYU)–Idaho, formerly Ricks College, has operated a seismic station for many years.

The historical earthquake record (since 1884) shows that the ESRP is seismically quiet, relative to the surrounding Basin and Range and Middle and Northern Rocky Mountain Physiographic Provinces. Since the installation of the INL's seismic network in 1971, only 29 small magnitude microearthquakes (magnitude < 1.5) have been detected within the ESRP. In contrast, thousands of earthquakes have occurred in the mountain ranges surrounding the ESRP. However, only two of these quakes, the 1959 magnitude 7.5 Hebgen Lake quake and the 1983 magnitude 7.3 Borah Peak quake, are considered significant (DOE-ID 2007).

Unstable soils and areas of mass movement do exist in southeastern Idaho. However, most of these soils and areas of mass movement occur on the steeper slopes of the NFSL that surround the lands in the Upper Snake FO.

Paleontologic Resources

Paleontology is the study of life from past geologic time, based on fossil remains of plants and animals. Paleontological resources (fossils) include the bones, teeth, body remains, traces, or imprints of plants and animals that have been preserved in the Earth's crust. All fossils offer scientific information, however, they are considered scientifically significant if they are unique, unusual, rare, diagnostically or stratigraphically important, or add to the existing body of knowledge of a particular species.

The BLM is legally required to identify, evaluate, and manage paleontological resources as part of its multiple-use mandate. Management of paleontological resources on BLM-administered public land is aimed at protecting scientifically significant fossils for the benefit of the public. Significant fossils are defined by BLM policy to include all vertebrate fossil remains (body and trace fossils) and those plant and invertebrate fossils determined to be scientifically unique.

For management purposes, lands within the FO fall within one of three classifications based on their potential to contain vertebrate or invertebrate fossils. The first classification includes those areas that are known to contain vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils. The second classification includes those with exposures of geologic units that have high potential to contain these resources. The third classification includes those exposures of geologic units that are very unlikely to contain these resources.

Invertebrate fossils are common in the Paleozoic rock units that are found in the mountain ranges that surround the ESRP. Although brachiopods, corals, bryozoans, gastropods, crinoids, cephalopods, and pelecypods are well-preserved, none of the fossils are considered to be of significant scientific importance.

Vertebrate fossils of significant scientific importance are found in Pleistocene lake bed deposits, alluvial fans deposits and stream channel deposits, in the Starlight and Salt Lake Formations of Tertiary age, the Wayan Formation of Cretaceous age, the Gannett Group of Cretaceous–Jurassic age, the Thaynes Formation of Triassic age, and the Phosphoria Formation of Permian age. Vertebrate fossils of significant scientific interest have also been found in several caves on the ESRP.

The most significant vertebrate fossils are found in the American Falls lake beds that are exposed on the west shoreline of America Falls Reservoir and on the eastern shore of Palisades Reservoir. Fossils from these localities include fish, reptiles, birds, amphibians, and mammals. Fossils of greatest significance include mammoth, ground sloth, saber tooth tiger, dire wolf, greater short-faced bear, horse, camel, giant bison, and musk ox. Similar Pleistocene fossils have been found in the Birch Creek Sinks, the Big Lost River alluvial deposits, alluvial deposits on the south end of the INL, and in the Market Lake area.

Specific fossil occurrences in the Upper Snake FO have been, and will continue to be, identified by field surveys conducted by permitted paleontologists, including faculty at universities and curators at museums, as well as by students conducting research. Additional fossil resources may be identified by BLM specialists or consultants conducting environmental reviews of specific land use proposals or by discoveries reported by members of the public.

2.4.3. Trends

Minerals

The demand for precious and base metals as well as energy resources and many industrial minerals is now being influenced by world markets rather than predominately domestic markets. The demand for mineral and energy resources by such countries as China and India have required them to compete for mineral materials and energy commodities that have historically been consumed by the U.S. and other countries in the Free World. The National Energy Policy Act of 2005 (42 U.S.C. 149 § 15801 et seq.) has also encouraged the exploration and development of additional oil and gas, geothermal, and wind power sources.

The only uncertainty that exists at a time of otherwise unprecedented demand for mineral and energy commodities, which are selling for record prices, is that Congress continues to debate and will likely pass a comprehensive reform of the Mining Law of 1872 (30 U.S.C. 2 § 21 et seq.). Proposed revisions include a royalty on locatable minerals produced from the public lands as well as the ability for federal agencies and interest groups to exclude additional public lands from locatable mineral development. Passage of such legislation would have a dampening effect on the development of locatable minerals from the public lands.

Unique Landforms

Identification of unique landforms or geologic features is a subjective process and there are currently no standard criteria. The BLM initiated the Geologic Heritage Initiative in 1998 in response to a perceived need for a national strategy to manage geological heritage resources consistent with Section 102 of FLPMA. No geologic features have been designated in the Upper Snake FO.

Big Southern Butte, the largest of the three buttes on the ESRP, has been proposed as an RNA based on geological and botanical criteria. The butte is composed of two rhyolite flows that squeezed up through the underlying basalt approximately 300,000 years ago. Although certainly not unique as a volcanic feature, the butte is impressive as it rises abruptly from the ESRP. A portion of the rhyolite in the butte has been hydrothermally altered and produced a ralstonite-like mineral that does not contain significant sodium (Na) or magnesium (Mg), which previously have been considered essential components of ralstonite.

Geologic Hazards

Geologic hazards occur as a result of the siting or design of structures or human activities. The potential for harm can usually be reduced through appropriate engineering or by siting the activity in a less hazard-prone location.

That portion of the Upper Snake FO that lies within the ESRP is relatively quiet seismically, when compared to the seismic activity that occurs in the mountains surrounding the plain and in Yellowstone National Park farther to the north. However, numerous fault zones occur within and surrounding the FO. Two of the major faults, the Grand Valley fault that extends from Rexburg, Idaho, to Alpine, Wyoming, and the Madison Range Fault that extends in a northwest–southeast direction immediately north of Henry's Lake, have experienced movement in the past. Further movement on either of these faults could have a major impact on residences and recreational activities. The major mountain ranges that surround

the FO have been built by faulting that has occurred along the margins of the ranges. Movement on these many faults could impact activities on the public lands.

Because southeastern Idaho is experiencing both increased commercial and residential growth, and more visitors are enjoying the public lands in the FO, the potential for exposure to seismic and other geologic hazards is increasing.

Paleontological Resources
No paleontological permits have been issued by the Upper Snake FO for the recovery of vertebrate fossils. Paleontological resources are addressed during project-specific NEPA document preparation. The need for paleontological protection has not been identified in any of these projects.

The trend is probably slightly downward for paleontological resources that are present but are not associated with direct management actions. The primary contributors to this trend are unauthorized collection of vertebrate fossils and limited law enforcement resources.

2.4.4. Forecast

Minerals
Forecasts for mineral exploration and development are discussed in **Section 2.26**, Energy and Mineral Resources.

Unique Landforms and Geologic Features
Unique geological features requiring some degree of protection could be identified during the review of existing and potentially new ACECs within the FO. Further protection may also result during the NEPA evaluation of future projects within the FO.

Geological hazards
Geologic hazards will continue to be evaluated during planning and review of specific projects within the FO.

Paleontological resources
Impacts to paleontological resources will continue to be addressed in the evaluation of projects that are approved within the FO. Projected increase in recreational use may increase the risk of damage and unauthorized collection in areas where paleontological resources are present.

2.4.5. Key Features

Minerals
Key factors for mineral exploration and development are discussed in **Section 2.26**, Energy and Mineral Resources.

Unique Landforms and Geologic Features
If unusual geomorphological features or other geologic features are identified that have unusual aesthetic or scientific value, actions would be taken to protect them through an ACEC designation or as a potential candidate for consideration in the geological heritage program.

Geological Hazards

Geologic hazards include known fault zones, landslide areas, and soils or geologic formations with hazardous chemical or engineering characteristics.

Paleontological Resources

These areas include Pleistocene lake bed deposits, alluvial fan and stream channel deposits, exposures of the Starlight and Salt Lake formations, the Wayan Formation, the Gannett Group, the Thaynes Formation, and the Phosphoria Formation. Those caves in the ESRP that contain fossils of significant scientific importance will also need to be protected.

This page left intentially blank.

2.5. Soil Resources

2.5.1. Indicators

Indicators of soil resource conditions can be grouped into four general categories: visual, physical, chemical, and biological. The selection of appropriate soil indicators should be based upon land uses and the ease and reliability of measurement of a particular indicator (National Soil Survey Center [NSSC] 1996). For land use planning and natural resource management, visual and physical indicators as identified below are best suited to describe soil conditions. Standard 1 (Watersheds) of the Idaho Standards for Rangeland Health and Guidelines for Livestock Grazing Management (i.e., Idaho Standards for Rangeland Health, BLM 1997a) also identifies similar indicators for determining soil conditions as follows:

- acres of highly erodible soils resulting from wind or water,
- acres with active rills and or gullies,
- acres of invasive species/noxious weeds, and
- acres with soil crusts or surface sealing such as compaction.

Visual evidence can be a clear indication that soil condition is threatened or changing as a result of natural or local climate changes, land uses, and activities (NSSC 1996). Physical indicators primarily reflect limitations to root growth, seedling emergence, infiltration, or movement of water within the soil profile (NSSC 1996).

2.5.2. Current Condition

Soils within the Upper Snake PA are generally deep (greater than 40 in. to bedrock) on nearly level to rolling terrain of the ESRP (0–16% slope angle). On undulating to hilly uplands (1–30% slope angle), slightly altered bedrock is often more than 40 in. below the surface. On steep and very steep slopes (20–60% slope angle), soils range from shallow (10–20 in.) to moderately deep (20–40 in.) over partially weathered bedrock. Rock outcrops are common on steeper slopes and gently sloping basalt lava flows with little or no soil development. The soils within the PA and FOA primarily consist of six soil orders: entisols, inceptisols, aridisols, alfisols, mollisols, and andisols. **Table 2-4** presents the six orders and their coverages, and **Figure A-4, Appendix A–Maps,** depicts these orders visually.

Soil Order Descriptions

Entisols are immature, mainly azonal soils (soils with no distinct horizons or layering) that can be found in either dry or wet sites. Entisols tend to occur on the youngest geological deposits, where soil has not yet developed into distinct horizons (i.e., layers). Entisols occur in areas of recently deposited parent material where erosion or deposition rates are faster than the rate of soil development and include soils associated with flood plains, playas, dunes, steep slopes, and loess deposits commonly found overlying basalt flows. Entisols are subject to water erosion on steep slopes and wind erosion on the flatter reaches. Entisols support a variety of vegetation classes across the Upper Snake PA as identified in **Table 2-5**.

Aridisols are semi-desert and desert soils that occur on dry but more stable sites (geomophically) than entisols and inceptisols and exhibit more surface horizon development. Aridisols are widely distributed

Table 2-4. Soil orders found within the Upper Snake PA.

Soil Order	Planning Area		BLM-Administered Public Lands	
	Acres	%	Acres	%
Aridisols	2,548,457	36	1,010,932	56
Mollisols	3,444,645	48	643,120	36
Inceptisols	293,987	4	97,361	5
Other[a]	113,605	2	43,620	2
Entisols	203,604	3	11,045	1
Alfisols	370,151	5	3,430	<1
Andisols	154,888	2	133	<1
Total	7,129,337	100	1,809,640	100

a. Other includes lava flows, sand, rock outcrops and water is not considered a soil order.

throughout the Upper Snake PA and the ESRP and support a variety of vegetation classess identified in **Table 2-5**. Aridisols tend to be high in calcium carbonate (lime) or sodium accumulations, making these soils very basic in terms of pH. Older aridisols may develop an argillic or clay-rich horizon. Organic matter production in aridisols is minimal because of a lack of precipitation. Soil surfaces are relatively stable, which allows for some development of a thin, darkened surface horizon. Aridisol surfaces with little vegetation are subject to wind erosion when dry and soil compaction when moist. Water erosion also occurs in aridisols on steeper slopes during infrequent rainstorms.

Mollisols are generally found in grasslands, shrub-steppe, mountain shrubland, and along riparian–wetland zones and support a large number of vegetation classes (**Table 2-5**). These soils are neutral to alkaline in pH (i.e., 7 or higher pH). Mollisols are found in a variety of precipitation zones, usually greater than 13 in., throughout the Upper Snake PA. As a result of sufficient precipitation, organic matter accumulates and creates a relatively thick, dark, organic-rich surface. Mollisols are very productive, relative to the other soil orders discussed. Mollisol surfaces are subject to water erosion and soil compaction when moist.

Inceptisols are young soils with a weakly developed cambic horizon and occur on older landforms and are more developed than entisols. They tend to exhibit thick, dark, soil horizons on fairly stable mountain slopes which can exhibit several vegetation classes (**Table 2-5**) across the Upper Snake PA. Montane inceptisols are extremely susceptible to water erosion in areas of sparse or no vegetation.

Alfisols are acidic (i.e., lower than 7 pH), forested soils with an argillic subsurface horizon that support several vegetation classes (as shown in **Table 2-5)**. They tend to be older than inceptisols and entisols. High leaching rates in these soils reduce surface organic matter and soil productivity. Alfisols occur in higher elevation areas that are cooler and receive more precipitation. Alfisol surfaces are subject to water erosion and soil compaction when moist.

Table 2-5. Soil orders and vegetation classes found in the Upper Snake PA.

	Soil Orders													
	Other		Alfisols		Andisols		Aridisols		Entisols		Inceptisols		Mollisols	
Vegetation Division/Formation	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Other	233	–	2	–	–	–	135	–	123	1	86	–	476	–
Annual Semi-Desert Grassland	1,747	1	–	–	–	–	21	–	–	–	–	–	320	–
Bedrock, Scree, Cliff and Canyon	–	–	65	2	–	–	2,822	–	387	3	861	1	14,110	2
Deciduous Semi-Desert Shrubland	–	–	–	–	–	–	21,880	3	115	1	2,609	3	1,738	–
Deciduous Woodland	65	–	–	–	–	–	26	–	481	4	–	–	2,966	–
Evergreen Forest	10	–	521	15	70	53	39	–	529	5	3,059	3	21,790	3
Evergreen Semi-Desert Shrubland	40,941	16	2,030	59	19	15	611,031	77	7,333	66	81910	84	339,040	53
Evergreen Woodland	128	–	–	–	–	–	6,585	1	138	1	6,660	7	1,408	–
Herbaceous Wetland	–	–	250	7	–	–	1,951	–	197	2	153	–	1,529	–
Mesic Shrubland	40	–	316	9	–	–	610	–	716	6	13	–	1,479	–
Mixed Evergreen Deciduous Forest	1	–	209	6	43	33	0	–	23	–	211	–	3,930	1
Open Water	518	–	37	1	–	–	258	–	402	4	3	–	1,325	–
Perennial Semi-Desert Grassland	62,738	24	–	–	–	–	142,097	18	677	6	1,837	2	250,441	39
Unconsolidated Materials	20,246	8	–	–	–	–	638	–	–	–	–	–	461	–
Urban/Industrial/Excavation Areas	–	–	–	–	–	–	529	–	–	–	–	–	58	–
Volcanic Rock	135,474	52	–	–	–	–	3,573	–	–	–	–	–	2,145	–
Total	262,143	100	3,430	100	132	100	792,198	100	11,121	100	97,401	100	643,215	100

Andisols form mostly in volcanic-released material such as ash, pumice, cinders, and lava and support forest-type vegetation classes (**Table 2-5)**. These soils have a characteristic layer of volcanic ash or pumice, 14 in. to several feet thick, over buried soil layers. Andisols, and andisol transitions to other soils orders, are among the most productive of western–montane forest soils.

2.5.3. Trends

Natural causes, such as wind and water, have resulted in soil erosion in localized areas across the Upper Snake PA. The major human-influenced causes of soil erosion found in the PA can be attributed to livestock grazing, OHV use, fire and fire suppression activities, and agricultural development. In addition, other human-influenced causes, other human-influenced causes (i.e., mining activities, road design/location, ROW authorizations, unauthorized OHV use, failed rehabilitation/restoration activities, and water level fluctuation from dams) can also contribute to increased soil erosion. Wildfires directly affect soil erosion by removing vegetation cover, sometimes at high rates, especially on highly erodible soils. These factors have occurred, and continue to occur. As a result, soils across the PA have been subjected to varying degrees of both soil loss and gain, which has subsequently resulted in soil productivity changes.

Idaho Standards for Rangeland Health (BLM 1997a), Standard 1 (Watersheds), requires evaluating soil features such as gullies, rills, and litter movement across the soil surface as part of rangeland health assessments. **Table 2-6** identifies the number of acres within the Upper Snake FOA that meet or do not meet Standard 1. As shown in the table, about 98% of the BLM-administered public lands are meeting Standard 1, and less than 1% is not meeting Standard 1.

Table 2-6. Status of achieving Standard 1 of the Idaho Standards for Rangeland Health on BLM-administered public lands, Upper Snake FO.

Idaho Standards for Rangeland Health	Public Lands	
Standard 1–Watersheds/Soils	Acres	Percent
Meets Standard 1	1,764,979	97.5
Making progress towards Standard 1	22,623	1.3
Not meeting Standard 1[a]	6,064	0.3
Not meeting Standard 1[b]	8,194	0.5
Public lands not assessed	7,780	0.4
Total	1,809,640	100

a. Standard 1 not being met due to water fluctuations in the Snake River resulting from the Palisades Dam.

b. Standard 1 not being met due to improper livestock management, which has been corrected.

2.5.4. Forecast

Continued implementation of the Idaho Standards for Rangeland Health should keep soils from deviating from desired conditions and enable improvement in conditions. Appropriate management and best management practices (BMPs) should be taken in areas with soils prone to wind and or water erosion when vegetative cover is disturbed or removed. Rehabilitation and restoration efforts would, over time, help soils return to natural rates of erosion.

2.5.5. Key Features

Soil types can be identified with the help of soil surveys. Soil properties are then determined from soil types. The chemical, physical, and mechanical properties of a soil can be used to determine its most appropriate uses and form the basis of interpretive soils maps. **Table 2-7** presents the six soil orders that occur in the PA and describes the uses to which they are best-suited.

Table 2-7. General best uses of soil orders found within the PA.

Soil Order[a]	Land Use Description
Aridisols	Mainly used for range, wildlife, and recreation. Because this type is largely found in areas of dry climate, aridisols are not used for agricultural production unless irrigation water is available.
Mollisols	This soil type accounts for extensive grassland ecosystems and are among some of the most important and productive agricultural soils.
Inceptisols	Often found on fairly steep slopes, young geomorphic surfaces, and on resistant parent materials. A sizable percentage of inceptisols is found in mountainous areas and support forestry and recreation.
Entisols	Entisols include all soils that do not fit into other soil orders. Many entisols are found in steep, rocky settings. However, entisols of large river valleys and associated shore deposits provide cropland and human habitat.
Alfisols	Combination of generally favorable climate and high native fertility results in very productive soils, which support both agricultural and silvicultural use.
Andisols	Andisols' unique chemical and physical properties include high water-holding capacity and the ability to "fix" and make unavailable to plants large quantities of phosphorus. Andisols best support silviculture.

a. Soil orders presented in decreasing order of occurrence in the PA.

This page left intentionally blank.

2.6. Microbiotic Soil Crusts

Microbiotic soil crusts (MSCs) are complex living communities. Crusts occur in all hot, cool, and cold arid and semi-arid regions. They may constitute up to 70% of the living cover in some plant communities (Belnap 1994). In many arid and semi-arid communities there are often many more species associated with the soil crust at a given site than there are vascular plants (Rosentreter 1986; Ponzetti et al. 1998). The PA is a cool, high-elevation desert that supports a host of common and rare MSCs.

MSCs are diverse and are formed by small living organisms and their by-products, which results in a "crust" of soil particles bound together by organic materials. These crusts are unique and markedly different from chemical and physical (soil) crusts, which are inorganic features, such as a salt crust or platy surface crust, that are often formed through trampling (compaction). MSCs are made up of mats, or filaments, of cyanobacteria (i.e., blue-green algae), lichens, mosses, microfungi, and other bacteria and are located in bare soil spaces between vascular plant communities (BLM 2001).

Structurally, biological crusts are a rough, uneven carpet, or skin, of low stature (0.4–3.9 in. in height). Below ground, lichen and moss rhizines, fungal hyphae, and cyanobacterial filaments form a matrix that binds soil particles together (Belnap 1995). Horizontally, soil crusts occupy the nutrient-poor zones between vegetation clumps in many types of aridland vegetation.

Shallow soils often support a wide variety of cyanobacteria, lichens, and mosses, regardless of soil texture. As soil stability increases, these rich communities of cyanobacteria, mosses, and lichens become more widespread, covering all surfaces not occupied by vascular plants or rock. Stable rocks near or at the soil surface also will increase the percent crust cover because the rocks perch water that may help protect the crust surface from physical disturbances (Rosentreter and Belnap 2001).

Soil texture heavily influences the species composition of crust communities. Fine textured soils (such as gypsum and silty loams) support greater cover and more varied populations of cyanobacteria, lichens, and mosses. Soil surface stability is influenced by both its texture (percent of sand, clay, and silt) and by the degree of moisture content (wet, moist, dry). For example, sand and silt are susceptible to surface disturbance when dry while, in contrast, clay is highly stable when dry. Course textured soils, such as sandy soils and those with high shrink-swell clays, generally contain only large filamentous cyanobacteria that are highly mobile (such as Microcoleus). In more unstable soils, lichen and mosses may be found only under vascular plants, where some protection from sediment burial is provided, or on north slopes where greater moisture availability favors growth.

Development of crusts is strongly influenced by soil texture, chemistry, and depth. Soil chemistry can also influence crust cover and composition. Calcareous soils generally support a high coverage of species-rich crust. Other abiotic factors that influence the relative cover of MSCs are slope and aspect. Crustal organisms are generally only active when wet and even with temperatures as low as freezing. Therefore, north and east slopes generally favor crustal development in lower elevation desert regions of the western North America. Slope angle does not generally affect crust cover or species richness, except where the slope or soils are unstable (Rosentreter 1986; Kaltenecker, Wicklow–Howard, Rosentreter 1997).

In rangelands, MSCs can be viewed from structural, functional, and compositional perspectives. Structurally, cyanobacterial and microfungal filaments weave through the top few millimeters of soil,

gluing loose particles together and forming a matrix that stabilizes and protects soil surfaces from erosive forces (Cameron 1966; Friedmann and Galun 1974; Friedmann and Ocampo–Paus 1976; Belnap and Gardner 1993), and prevents the establishment of invasive annual grasses. Functionally, MSCs are living mulch that retains soil moisture and discourages annual weed growth. MSCs also provide nutrients to the surrounding plant community by "fixing" atmospheric nitrogen and carbon (i.e., converting gases into compounds that plants and other organisms can assimilate) (BLM 2001). Compositionally, MSCs contribute to soil organic matter (Eldridge and Greene 1994) and have been shown to influence availability of many plant-essential nutrients.

Crust loss can result in less plant-available magnesium, potassium, iron, calcium, phosphorus, manganese, and sulfur (Harper and Belnap 2001). Disturbance and loss of MSCs result in the alteration of the relative distribution of crust components (i.e., lichens, mosses, cyanobacteria) across the landscape (Klopatek 1992), which ultimately alters the distribution of nutrients provided by crusts. In areas where MSCs have been lost, native vascular plants have been replaced by invasive species such as cheatgrass (*Bromus tectorum*).

When developed under optimal conditions, healthy crusts can be somewhat tolerant of surface disturbances. There are primarily two types of disturbances that impact crusts, natural occurances and human-influenced. These are not well defined, but at their extremes, wind and rain disturbance may be viewed as natural disturbances. Human-influenced disturbance could result from OHV, hiking, or livestock trampling on crusts.

MSCs are susceptible to damage and destruction from surface-disturbing activity especially during their early development. As such, the condition of MSCs reflects the level of physical disturbance in a given area (Belnap 1995).

Regardless of the source of disturbance, recovery depends upon the health of the crust at time of disturbance, the severity of the disturbance, the time since last disturbance, and whether or not optimal development conditions were present during recovery. For example, conditions typically are best for crust recovery during wet or moist conditions on both sandy and clayey soils. Fine-textured soils have faster crust recovery rates than coarse-textured soils (BLM 2001b).

2.6.1. Indicators

Rangeland managers in North America have historically used key indicator plants for determining the ecological trend and health of vegetation (U.S. Department of Agriculture [USDA] 1937; Stoddart, Smith, and Box 1943). MSCs can also be used as indicators of ecological health. In addition, they act as indicators of abiotic factors, such as the presence of calcareous (calcium carbonate containing) soils. Most crustal organisms are biologically active during the cool seasons when the soil surface is moist (Rosentreter 1986). MSCs have the ability to photosynthesis at temperature just above freezing, allowing them to grow earlier in the season that most vascular plants. Generally when MSCs are moist they are more resistant to disturbance. When the surface is lightly broken (e.g., hoof or foot print) and the crusts are active, the ability to recover the area is high. When the crust is churned under (i.e., creation of a trail or vehicle path) or buried, MSCs have little chance of recovering the site once the top of the soil has been removed. MSCs are most venerable to removeal when they are dry and inactive (i.e., warmer season). Once broken, MSCs can become dust-like and removed by wind, leaving the ground bare with no

protection from erosion. In contrast, vascular plants are active in spring and summer when air temperatures are well above freezing. Also, crust composition and level of abundance can be used to determine the ecological history and condition of a site (BLM 2001).

2.6.2. Current Conditions

Current conditions for MSCs within the Upper Snake FOA are little known, as initial monitoring plots have been established in only a few locations, and other locations have not been a focus for MSC observations.

In the Little Lost and Birch Creek Valleys, in areas where disturbance has been minimal, there seems to be healthy populations for MSCs. The Big Desert area has pockets of minimally disturbed MSC, but a large portion of the area has been prone to repeated wildfires and historic planting of non-native grasses has limited their development.

In the Sands area, crusts have been mostly observed under bitterbrush and sagebrush canopies and lacking in the interspaces. The potential to find MSCs in actively moving, unvegatated sand is low, and there is only a slightly higher potential for them to be found in sandy soils where there is vegetation cover that reduces the movement of sand. This loss of interspace MSCs could have been a result of natural occurrences, for example the windblown shifting and deposition of sandy soils that buried and killed MCSs by prohibiting photosynthesis. Interspace crust lost could have also resulted from disturbance. In this particular area, trampling during historic livestock grazing and/or wildlife herd migration may have resulted in crust compaction/burying. Regardless as to the cause, crust loss leads to reduced soil productivity, decreased plant cover and vigor, and increased wind and water erosion.

Many of the vegetative communities found in the Upper Snake FOA have evolved with the presence of MSCs. The cool desert climate provides for relatively stable soils, moderate annual precipitation, and many sunny days that would allow for temperatures to be above freezing, supporting MSC communities to develop in undisturbed native vegetative communities.

2.6.3. Trends

MSCs are being observed as providing very important links to developing and maintaining a healthy ecosystem. They have been identified to fill roles previously unknown in the environment such as providing nutrients to plant communities, adding to species diversity of ecosystems, and protecting soil from erosion.

Generally, unlike vascular plants, crustal organisms are not greatly influenced by short-term climatic conditions. However, crusts, and lichens, in particular, respond to environmental factors differently from, and on separate, and longer, time scales than vascular plants (McCune and Antos 1982). This characteristic may make MSCs ideal indicators of long-term ecosystem health, as each community component can provide information that may complement, explain, or indicate something about a site's characteristics and disturbance history.

Within the FOA, more inventories are needed to show what areas have MSCs present. Monitoring in areas of concern is essential to understanding the trends for MSC in the FOA.

2.6.4. Forecast

Only recently have MSCs been recognized as having a major influence on terrestrial ecosystems. The science is still relatively new and currently there is little management guidance available. However, land managers are beginning to understand the importance of MSCs and their role in the ecosystem. As more of the science becomes available and MSCs are better understood, it is expected that the MSC resource will become more important in the management of resources and resource uses.

For the Upper Snake FOA, and as part of the Idaho Standards for Rangeland Health assessment process, more areas of MSCs are expected to be identified and studied. Additionally, unique crust species and populations could be found as survey activities continue.

2.6.5. Key Features

The Little Lost River and Birch Creek Valleys are two locations that have unique MSC cover. The precipitation, soil composition, and vegetative components in these valleys are conducive to forming ideal habitat for crusts. The rain shadow effect for the Little Lost and double rain shadow effect for the Birch Creek valleys create habitat where fewer vascular plants can survive but create a unique opportunity for MSCs to thrive. Where MSCs require significantly less moisture to live, they make up a large portion of the species diversity of these to valleys.

Both valleys are host to unique groups of vagrant lichens that, to date, have only been located in these particular valleys that extend north of the PA.

Earth lichen (*Catapyrenium congestum*), a special status species MSC, known from natric soils (a unique soil type high in clay and sodium and sometimes high in calcium) is documented in a few locations within the PA (Hagwood 2006).

2.7. Water Resources

Water resources typically are described by the following four categories: surface water quantity, surface water quality, ground water quantity, and ground water quality. On the Upper Snake FOA, BLM collects some streamflow and water quality data for surface water bodies. However, there are other federal and state agencies that have primary responsibility for the State's water quantity and quality data. These agencies include, but are not limited to, the USGS, Idaho Department of Water Resources (IDWR), IDEQ, DOE (via the INL), and Idaho Department of Health and Welfare (IDHW). These agencies collect most of the data for water resources.

2.7.1. Indicators

The following indicators are used when discussing water quantity and quality.

- surface water quantity—surface water flows and volume,
- surface water quality—Section 303(d) water quality-limited, listed streams under the Clean Water Act (CWA, 33 U.S.C. 26 § 1251 et seq.) and riparian functioning condition (discussed in detail in **Section 2.9**, Vegetation—Riparian Habitat and Wetlands), and
- ground water—ground water elevations.

2.7.2. Current Condition

Surface Water Quantity

The Upper Snake PA contains a large variety of stream types, from very small spring creeks to reaches of medium and large rivers. Within the PA, BLM manages lands along approximately 465 mi of streams and rivers, 681 individual springs, and 70 acres of lakes and ponds. BLM manages public lands within the 12 fourth-level watersheds, shown by hydrologic unit code (HUC) in **Table 2-8**, and along 10 major streams or rivers, as shown in **Table 2-9**. Waters from spring developments, reservoirs or streams, and stream diversions within the FOA are used primarily for livestock and wildlife. Some waters used for domestic purposes and one municipal watershed also originate on the FOA. Diversions on public lands support hydropower generation, private land crop irrigation, and stockwater needs.

Table 2-8. Watersheds within the Upper Snake PA.

Watershed Name	Watershed Hydrologic Unit Code	Watershed Name	Watershed Hydrologic Unit Code
American Falls	17040206	Lower Henry's	17040203
Beaver–Camas Creeks	17040214	Medicine Lodge Creek	17040215
Big Lost	17040218	Palisades	17040104
Birch Creek	17040216	Teton	17040204
Idaho Falls	17040201	Upper Henry's	17040202
Little Lost	17040217	Willow Creek	17040205

Table 2-9. Major streams and rivers within the Upper Snake PA.

Stream/River Name	Miles of Public Lands along Rivers and Streams
Big Lost River	0.75
Birch Creek	6.6
Falls River	2.0
Henry's Fork of the Snake River	18.3
Little Lost River	18.5
Main Snake River	72.0
Medicine Lodge Creek	2.3
South Fork of the Snake River	77.5
Teton River	8.6
Willow Creek	12.3
Total	218.8

Other surface waters found on public lands include shoreline and open water habitat on lakes, reservoirs, ponds, and playas. Many of these, especially in the lower elevation rangelands, are seasonally dry. The PA's streams and other surface waters are found within a wide variety of elevations, topographic settings and landscapes. The majority of the rivers in the Upper Snake FOA have been developed by a dam and reservoir, irrigation diversion(s), hydroelectric diversion(s), or a combination of these. Stream and river conditions vary widely from completely undisturbed river and vegetative communities in inaccessible rocky canyons to deep, erodible soil banks at lower elevations where recreationists, livestock, and users have access to stream banks.

Regionally, large volumes in reservoir storage and irrigation distributions are available within the PA: from 1980 to 2001 an average of 7M acre-feet (ac-ft) was diverted annually for irrigation on the ESRP (Cosgrove, Contor, and Johnson 2006). Recharge to the PA's largest ground water source, the ESRP Aquifer, results from seepage of surface water used for irrigation, stream and canal losses, under flows from tributary drainage basins, and precipitation infiltration.

Water Rights

The Upper Snake FOA has a total of 1,236 water right claims in the Idaho Snake River Basin Adjudication (SRBA) for livestock and wildlife. Spring claims make up 681 of the total number (55%). The remaining water right claims consist of streams, ditches, wells, ponds, lakes, playas, and reservoirs. There are seven licensed/permitted minimum streamflows within the Upper Snake FOA: Badger and Wet Creeks in the Little Lost Watershed, Willow Creek east of Idaho Falls, Bitch Creek, the Henry's Fork of the Snake River, and the Warm and Teton Rivers.

Hydroelectric Diversions

The Upper Snake FOA has several streams diverted on public lands for hydroelectric power generation. Several streams on the Lemhi Range are diverted to three hydropower generating stations. Most of these stream diversions are found in the Little Lost River Valley, with one on Birch Creek. The Dry Creek

hydropower project diverts Dry Creek to generate power at a station adjacent to Wet Creek. The Birch Creek hydropower project diverts this entire stream just above the old Reno Ditch diversion. The energy generated from these diversions is for both private use and sold to area utility companies.

Surface Water Quality

Water quality variability on BLM-managed streams is strongly influenced by the intensity of human activity which is a function of access. For example, water quality may be vastly different in a remote spring creek than it is in waters where there are high human-caused impacts and easily accessible streams occurring upstream.

The dominant legislation affecting the Nation's water quality and BLM's compliance with Idaho water quality requirements is the CWA (i.e., Federal Water Pollution Control Act). The primary goal of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. The CWA includes the Federal Facilities Pollution Control section, which states that all federal agencies shall comply with all federal, state, and local water quality and environmental requirements. Currently, the most significant water quality requirements affecting BLM's land management activities comes from the water quality standards and implementation plans section (also known as Section 303(d)) of the CWA and EPA regulations (§130.2 (J), § 130.740 [40 CFR I § 130 et seq.]) where individual states were given authority to determine which waters in their state do not meet water quality standards and/or have impaired beneficial uses. These waters are commonly referred to as "water quality-limited" or "303(d)-listed" streams. Section 303(d) also requires states to determine total maximum daily loads (TMDLs) for their 303(d)-listed streams. The TMDL determination process requires coordination of state, private, and federal entities, through watershed area groups (WAGs), to work on subbasin assessments for each HUC, to analyze the pollutant load for each listed stream, and to allocate a maximum load to that stream for each pollutant. Once complete, the TMDL determination impacts federal agencies through subsequent HUC-specific implementation plans, which define how land management agencies will reduce pollutant inputs to the listed streams.

Within the Upper Snake FOA, all of the watersheds with listed streams that required TMDL determinations have them in place. The most common pollutants for these stream reaches are sediment and water temperature. The most widely reported beneficial uses for these listed streams are cold water aquatic life and salmonid (trout) spawning.

One of the indicators for water quality condition is riparian functioning condition (Ecological Solutions Group 2009; see **Section 2.9**, Vegetation—Riparian Habitats and Wetlands). The Upper Snake FO manages about 128 mi of stream banks of the 2002 Section 303(d)-listed streams,[3] which is approximately 28% of the total stream miles. Of these 128 mi, 46 mi are in proper functioning condition (PFC), 63 mi are functional at risk (FAR), and 19 mi are non-functional (NF).[4] **Table 2-10** lists the PA's 2002 Section 303(d)-listed streams and their pollutants, and **Figure A-5, Appendix A–Maps,** displays these streams and the PA watersheds.

[3] 2002 is the most recent year for which EPA-approved data were available at publication.

[4] *Ibid.*

Table 2-10. Section 303(d)-listed, water quality-limited streams and their pollutants within the PA.

Watershed/HUC	Water Body	Reach	Pollutant[a]	Total Length (mi)	BLM-Administered Length (mi)
Palisades/17040104	South Fork Snake River	Black Canyon to river mile 856	U	48.29	22.5
		Palisades Res. to Fall Creek (Crk)	U	77.78	
Idaho Falls/17040201	South Fork Snake River	River Mile 856 to dry bed	U	20.45	
		Dry bed to river mi 791	S	5.72	
Upper Henry's/17040202	Howard Crk	Source to mouth	T	15.24	0.19
	Icehouse Crk	Source to Island Park Resv.	S	17.65	0.76
Teton/17040204	Fox Crk	WY border to ditch	T	0.91	0.10
	North Leigh Crk	WY border to mouth	U	4.99	0.11
	Warm Crk	Source to mouth	U, P	5.78	0.41
Willow Cr./17040205	Grays Lake Outlet	Hell Crk to mouth	T	4.70	7.24
		Homer Crk to Hell Crk	T	8.61	
	Hell Crk	Source to mouth	N, S	17.26	1.26
	Tex Crk	Source to mouth	S	8.85	1.81
	Willow Crk	Bulls Fork to Ririe River	S	2.99	0.80
Beaver–Camas/17040214	Beaver Crk	Idaho Crk to Miners Crk	U, P	12.83	0.24
		Source to Idaho Crk	P	14.74	1.77
	Camas Crk	Spring Crk to Beaver Crk	N, S, T	41.33	0.20
	Ching Crk	Source to mouth	U	11.93	1.44
	Dry Crk	Source to mouth	U	7.08	3.89
	Threemile Crk	Source to mouth	U	23.11	1.00

Watershed/HUC	Water Body	Reach	Pollutant[a]	Total (mi)	BLM-Length (mi)
Medicine Lodge/17040215	Deep Crk	Source to mouth	U	77.10	10.50
	Dry Crk	Source to mouth	S	5.20	2.40
	Edie Crk	Source to mouth	S	10.17	3.30
	Horse Crk	Source to mouth	U, S	8.42	1.60
	Indian Crk	Confl. of West Fork and East Fork to mouth	U	6.04	0.25
	Irving Crk	Source to mouth	P, S	13.69	3.80
	Medicine Lodge Crk	Edie Crk to Indian Crk	S, T	14.72	2.30
	Middle Crk	Dry Crk to mouth	U, P	5.61	2.61
		Source to Dry Crk	S	12.12	
	West Fork Indian Crk	Source to mouth	U, P	24.45	2.13
Little Lost/17040217	Badger Crk	Source to mouth	T	6.55	4.80
	Summit Crk	Source to mouth	T	9.00	4.34
	Moffet Crk	Source to mouth	U	44.96	1.43
	Big Spring Crk	Source to mouth	T	8.10	4.60
	Deer Crk	Source to mouth	T	17.21	3.80
	Little Lost River	Wet Crk to Badger Crk	T	8.89	17.40
		Badger Crk to Big Springs Crk	U	14.14	
		Big Springs Crk to canal	U	5.77	
		Canal to playa	T	18.62	
	Sawmill Crk	Warm Crk to mouth	T	8.13	6.82
	Squaw Crk	Source to mouth	T	12.53	0.61
	Wet Crk	Source to Squaw Crk	U, P	53.22	11.9
		Source to Squaw Crk	T	5.80	
		Squaw Crk to mouth	T	8.36	
		Source to mouth	U	50.16	
Total				799.20	128.31

a. N = nutrients, P = pathogens, S = sediment, T = temperature, U = unknown.

Ground Water

Ground water within the Upper Snake FOA occurs in shallow, unconsolidated sediment along streams and valleys and in the deeper, expansive ESRP Aquifer. The aquifer is approximately 170 x 60 mi, covering about 10,800 mi^2, and is an important irrigation and drinking water source for southeast and south–central Idaho. The majority of the FOA lies atop the aquifer, which extends from the headwaters of Camas Creek in Clark County, and the Henry's Fork in Fremont County, to King Hill in Elmore County. These public lands serve as an important ground water recharge area because they comprise recent lava flows, with little soil cover, which allows precipitation to easily infiltrate the aquifer. The Upper Snake PA also contains areas of "thiner" soil cover (less than 40 in.) that provides for high infiltration potential (basalt) to the aquifer (Garabedian 1992). Recharge from average annual precipitation over the entire ESRP to the ground water system was estimated to be about 700,000 ac-ft. The USGS estimates a significant recharge amount to the ground water system still occurs from tributary streams (the "Lost" streams) and their canals and ditches. **Table 2-11** presents these estimates (Garabedian 1992).

Table 2-11. Estimated average annual losses to the ground water system.

Drainage Basin	Surface Water Loss to Ground Water System (ac-ft)
Big Lost River	51,000
Little Lost River	12,000
Medicine Lodge Creek	30,000
Beaver Creek	31,000
Camas Creek	63,000
Total	187,000

Within the Upper Snake PA, public lands often contain the lower end of streams that infiltrate completely into the ground, not reaching a larger stream such as the Snake River.

Regionally, most ground water moves through the ESRP Aquifer through interflow zones in the Quaternary basalt of the Snake River Group. Ground water flows are generally from the recharge areas in the northeast to the discharge areas along the Main Snake River (confluence of South Fork and Henry's Fork of the Snake River to Lewisville Knolls) in the southwest. Across most of the ESRP, where public lands border areas irrigated with ground water, water levels are usually highest from October to March and lowest in July and August. Ground water data from 1944 to 1993 show annual water level fluctuations ranging between 5–20 ft in wells in Bonneville, Butte, Clark, Jefferson, and Fremont counties (Tungate 1995). Ground water levels on public lands typically rise and fall annually in response to precipitation, recharge, and pumpage. Flow in, and recharge to, the ESRP Aquifer throughout the PA is controlled largely by surface water diversions (for irrigation), and leakage and infiltration, from the Snake River and its major tributaries. Aquifer discharge consists largely of spring flows back to the Snake River in the Milner to King Hill reach, and irrigation pumpage.

Ground water quality on BLM-administered public lands throughout most of the Upper Snake FOA is high and fully supports the "beneficial use" of livestock water, which is its primary use. Private wells adjacent to BLM lands are used for livestock, domestic, irrigation, and industrial uses. This water also

provides additional water for wildlife. Ground water quality beneath public lands is expected to be high for all of the Big and Little Lost River drainages and their tributaries.

The only major area of known ground water contamination is located beneath the INL, the 890 mi^2 DOE nuclear research facility, located about 32 mi west of Idaho Falls. INL consists of a number of major facilities that draw water from the ESRP and, in the past, have contributed contaminants to it. At a time when it was acceptable disposal practice, approximately 17,300 tons of hazardous materials were deposited through an injection well that extended 100 ft into the aquifer (EPA 2007). The INL, through its history, has also discharged liquid effluents into numerous unlined ponds and an earthen ditch. Disposed waste materials included waste solvents, acids, radionuclides (i.e., such as tritium, technetium-99, cesium-137, and strontium-90), inorganic solvents (i.e., carbon tetrachloride, dichloroethylene, and trichloroethylene), and laboratory wastes (EPA 2007). As a result, soils were also contaminated and contain heavy metals, such as lead and mercury; VOCs, and radionuclides. The ground water contamination at INL occurs in both shallow, perched water bodies beneath the various facilities' unlined discharge ponds, as well as deep into the ESRP. Potential health risks may exist from ingesting or coming in direct contact with the contaminated groundwater and soil. The ESRP is the source of all water used at the INL.

The majority of the land within the INL boundary is withdrawn through public land orders in 1946, 1949, and 1950. On November 15, 1989, the INL was placed on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, 42 U.S.C. 103 § 9601 et seq.) National Priorities List, otherwise known as the "Superfund" list.

Although ground water contamination is very extensive at individual DOE facility plumes, the contamination has not impacted most of the BLM livestock wells south (downgradient) of the INL boundary. Some slight contamination was detected in a few deep livestock wells, but was below both regulatory thresholds and detection levels of standard sampling and laboratory techniques.

2.7.3. Trends

Surface Water Quantity

Streamflow and pond and lake volumes can vary based on climatic conditions (wet and dry cycles), upstream surface water diversions, and ground water pumpage-inducing surface water leakage. In general, recent drought cycles have resulted in stream flows that are below historic averages. However, this is a natural cycle and likely temporary. Across most of the PA, BLM-administered public lands usually lie downstream of the NFSL; thus, the threat of additional surface water diversions reducing streamflows further is minimal. However, in mixed ownership drainages where ground water pumpage is high because of irrigation needs (e.g., Big Lost River and Little Lost River Valleys), higher stream losses may be expected. Overall, the current trend in surface water quantity is a slight reduction resulting primarily from drought but also because of anticipated future diversion, ground water pumpage, and associated channel loss increases.

Surface Water Quality

In addition to beneficial use reconnaissance data, collected by the IDEQ, and BLM FO-specific data, an indicator of trend for BLM streambanks is riparian functioning condition. The most current riparian

condition trend information available for the 128 mi of streams for the 2002 Section 303(d)-listed streams under the administration of the Upper Snake FO indicates that

- 55 mi are upward trending (improving),
- 8 mi are downward trending (not improving),
- 21 mi are static (having remained unchanged), and
- 44 mi of streams where the trend is unknown.

Based on riparian functioning condition and water quality data, field observation, and photo point data collected by BLM personnel, the current trend in surface water quality is a slow but steady improvement in nearly all water quality parameters, except for a current, negative trend in water temperature, which is primarily a result of drought conditions. The riparian functioning condition data also shows an overall upward trend in streambank stability characteristics, which should result in decreasing sediment recruitment on the stream reaches on public lands.

Ground Water

On a regional scale, significant ground water volume changes have taken place within the ESRP Aquifer since the late 1800s. For example, decreed surface water rights and irrigated acreages on the ESRP increased from about 330,000 acres in 1899 (all from diverted surface water) to 2,270,000 acres in 1979: 1,230,000 acres of surface water irrigation and 930,000 acres of ground water irrigation (110,000 acres from combined surface and ground water sources) (Garabedian 1992). Estimates from water budget analyses on the ESRP Aquifer indicate that, after about 100 years of irrigation on the ESRP, total ground water volume in storage within the aquifer increased approximately 24M ac-ft from 1880 to 1952 (primarily from surface water irrigation and leakage), but then decreased about 6M ac-ft from 1952 to 1980, resulting from increased ground water pumpage, decreased precipitation, and other changes in irrigation practices (Kjelstrom 1995).

Ground water quantity and quality within the FOA currently remains fairly static year to year and, because of the remote location of the wells, has not been greatly affected by neighboring private irrigation wells. Individual wells in certain areas nearer to adjacent private lands likely experience seasonal drawdowns. In general, the BLM wells, because of well depth, remoteness, and small volume of ground water pumpage, exhibit static trends, both in quantity and quality.

The May 15, 1992, IDWR Moratorium Order, as amended, on new irrigation wells and new irrigation water right claims was expected to help ensure a more static ground water table elevation. However, Idaho has experienced low precipitation years and drought since the mid-90s. Recently, several recharge projects are being designed and implemented to take advantage of normal to above-normal precipitation years, and a few of these projects have begun implementation.

According to Lyle Swank (BLM 2009b), regional manager of Idaho Department of Water Resources, eastern region, the moratorium on withdrawals, normal to above-normal precipitation years, and implemented recharge projects should help to stabilize, and may even increase, ground-water table elevations.

Ground water on the INL, although still contaminated, is being improved through cleanup activities driven by the Federal Facility Agreement and Consent Order between DOE, the EPA, and the State of Idaho (DOE-ID 1991) and subsequent settlements/agreements; change of the INL's mission to sustainable energy systems and homeland security capabilities; and the site's commitment to environmental stewardship. A letter from the EPA (2006) to the DOE regarding a sitewide 5-year review conducted by the INL, expresses approval of the cleanup progress to date, and of the 357 areas identified for cleanup, over two-thirds have been completed and 20 of 23 records of decision for proposed cleanup actions have been signed (EPA 2007).

2.7.4. Forecast

Surface Water Quantity

A slight decrease in streamflows and surface water volumes is forecasted for the near future based on the continued drought patterns and continued ground water pump-induced changes, especially for the Big Lost and Little Lost drainages.

Surface Water Quality

Past and present riparian–wetland exclosure and pasture projects, better road maintenance, assessing grazing allotments through the Idaho Standards for Rangeland Health (BLM 1997a) and implementing grazing management changes (e.g., adjusting livestock numbers, season of use) has improved riparian functioning condition. However, even when riparian–wetland vegetation responds and improves habitat values, a longer time is usually required before stable and covered stream banks are realized and water quality is improved, especially water temperatures. Even with improved stream bank condition on BLM-administered reaches and reduced pollutant loading, other land uses upstream along mixed ownerships can continue to impair beneficial uses on the BLM reaches. Overall, continued improvements in surface water quality parameters are predicted as riparian functioning condition, streambank stability, and tree and shrub density and height continue to improve**.**

Ground Water

Ground water elevations will likely continue to decline in areas of past elevation reductions, and likely continue to stay static in most of the highly remote BLM wells. If increased irrigation or industrial wells and pumpage are allowed, or other ground water withdrawals from transfers are made, ground water elevations in BLM wells would likely exhibit reductions as well. Ground water quality over most of the FOA should remain fairly high and static. Ground water quality over time will likely continue to improve beneath the INL.

2.7.5. Key Features

Municipal Watershed

The Upper Snake FO manages public lands along Game Creek in Teton County, Idaho, that provide drinking water for the town of Victor, Idaho. The 656-acre Victor Municipal Watershed, which is located approximately 3 mi. east of the town, consists of a complex of forested springs that are protected from livestock grazing (BLM 1985).

Sole Source Aquifer

In 1991, EPA declared the ESRP Aquifer a "sole source aquifer" (IDEQ 2005) as it is the sole drinking water source for about 300,000 people in eastern Idaho.

This page left intentionally blank.

2.8. Vegetation—Upland Vegetation and Habitats

The National Vegetation Classification Standard (NVCS) was developed by the Federal Geographic Data Committee (FGDC 2008) vegetation subcommittee who has responsibility for creating a federal vegetation classification standard and which is being used by the Upper Snake FO to describe existing vegetation within the FOA. The NVCS is hierarchical in structure, with a small number of generalized types at the higher level and an increasingly large number of more detailed types at the lower levels. The upper levels of the NVCS are based primarily on the growth form, cover, and structure of the vegetation (not individual species); the lower levels are based primarily on species composition and abundance; and the middle levels are based on a combination of vegetation criteria.

As defined by the NVCS, and shown in **Table 2-12**, the Upper Snake PA falls into the following six classes of vegetation:

- forest and woodland,
- mesic shrubland and grassland,
- semi-desert shrubland and grassland,
- sparse vegetation and natural and barren areas,
- urban and other developed lands, and
- open water.

Under these six classes, the PA falls under nine formations of vegetation. Within these formations, precipitation, other climatic factors, availability of water, soils, elevation, and exposure all contribute to the diversity of vegetation. As shown in **Table 2-12**, the nine formations of vegetation are:

- forest,
- woodland,
- mesic shrubland,
- mesic grassland,
- semi-desert shrubland,
- semi-desert grassland,
- sparse vegetation and barren areas,
- urban, and
- open water.

These nine formations are subdivided into 15 divisions of vegetation that are present in the PA area. These divisions are shown in **Table 2-12** and also displayed in **Figure A-6, Appendix A–Maps**. The divisions are further divided into ecological systems (Comer et al. 2003). The ecological systems located on the FOA are described in the following paragraphs. **Table 2-12** also shows the approximate acres of each vegetation type present in the FOA.

Middle Rocky Mountain Montane Douglas–Fir Forest and Woodland covers 15,421 acres within the FOA. This ecological system occurs throughout the middle Rocky Mountains of central and southern Idaho (Lemhi, Beaverhead, and Lost River mountain ranges) and south and east into the greater Yellowstone region. This is a Douglas-fir (*Pseudotsuga menziesii*)[5] dominated system without the maritime floristic composition; these are forests and woodlands occurring in the central Rockies where the southern monsoon influence is less and maritime climate regime is not important. This system includes extensive Douglas-fir forests, occasionally with limber pine (*Pinus flexilis*) on calcareous substrates, and lodgepole pine (*Pinus contorta*) at higher elevations. Understory components include

[5] A species, when first presented as a part of an Upper Snake FO-specific discussion, is shown with its scientific name.

Table 2-12. Existing vegetation in the Upper Snake FOA.

Class	Formation	Division	Ecological System	Acres[a]	Total (Acres)[a]
Forest & Woodland	Forest	Evergreen	Middle Rocky Mountain Montane Douglas-fir Forest (and Woodland)	15,421	30,436
			Rocky Mountain Lodgepole Pine Forest	1,132	
			Rocky Mountain Subalpine Dry–Mesic Spruce-Fir Forest (and Woodland)	9,466	
		Mixed Evergreen Deciduous	Inter-Mountain Basins Aspen–Mixed Conifer Forest (and Woodland)	4,417	
	Woodland	Deciduous	Rocky Mountain Lower Montane–Foothill Riparian Woodland (and Shrubland)	3,538	18,458
		Evergreen	Inter-Mountain Basins Juniper Savanna	14,417	
			Rocky Mountain Subalpine–Montane Limber–Bristlecone Pine Woodland	503	
Mesic Shrubland & Grassland	Mesic Shrubland		Rocky Mountain Subalpine–Montane Riparian Shrubland	3,174	3,174
	Mesic Grassland	Herbaceous Wetland	Inter-Mountain Basins Alkaline Closed Depression	2,004	4,080
			Rocky Mountain Alpine–Montane Wet Meadow	2,076	

Class	Formation	Division	Ecological System	Acres[a]	Total (Acres)[a]
Semi-Desert Shrubland & Grassland	Semi-Desert Shrubland	Deciduous	Inter-Mountain Basins Curl-leaf Mountain Mahogany Woodland (and Shrubland)	4,847	1,109,700
			Inter-Mountain Basins Greasewood Flat	1,839	
			Inter-Mountain Basins Mixed Salt Desert Scrub	19,655	
		Evergreen	Great Basin Xeric Mixed Sagebrush Shrubland	290,819	
			Inter-Mountain Basins Big Sagebrush Steppe	582,071	
			Inter-Mountain Basins Montane Sagebrush Steppe	210,469	
	Semi-Desert Grassland	Perennial Grassland	Great Basin Xeric Mixed Sagebrush Shrubland (Fire)	6,804	459,879
			Inter-Mountain Basins Big Sagebrush Steppe (Fire)	28,0852	
			Inter-Mountain Basins Montane Sagebrush Steppe (Fire)	33,249	
			Non-Native Perennial Grassland[b]	136,886	
		Annual Grassland	Bromus tectorum Semi-Natural Herbaceous Alliance[b]	2,088	
Sparse Vegetation & Natural Barren Areas		Unconsolidated Materials	Inter-Mountain Basins Active and Stabilized Dune	21,345	21,345
		Volcanic Rock	Inter-Mountain Basins Volcanic Rock and Cinder Land	141,192	141,192
		Bedrock, Scree, Cliffs & Canyons	Inter-Mountain Basins Cliff and Canyon	18,245	18,245
Urban & Other Developed Lands	Urban/Industrial /Excavation Areas		Urban/Industrial/Excavation Areas	587	587
Open Water			Ponds/Lakes/Rivers/Streams	2,544	2,544
Total (Acres)					1,809,640

a. Data current as of May 2009.
b. These are not ecological systems but are considered important to list with the ecological systems for this classification system.
Source: Federal Geographic Data Committee 2008.

shrubs such as mallow ninebark (*Physocarpus malvaceus*), common juniper (*Juniperus communis*), snowberry (*Symphoricarpos occidentalis*), Oregon grape (*Mahonia repens*), and graminoids such as pinegrass (*Calamagrostis rubescens*), Ross' sedge (*Carex rossii*), and spike fescue (*Leucopoa kingii*). The fire regime is of mixed severity with moderate frequency. This system often occurs at the lower treeline immediately above valley grasslands, or sagebrush steppe and shrublands.

Rocky Mountain Lodgepole Pine Forest covers 1,132 acres within the FOA. This ecological system is widespread in upper montane to subalpine elevations of the Rocky Mountains and Intermountain West region. These are subalpine forests where the dominance of lodgepole pine is related to fire history and topo-edaphic conditions. Following stand-replacing fires, lodgepole pine will rapidly colonize and develop into dense, even-aged stands. Most forests in this ecological system occur as early to mid-successional forests that developed following fires. Soils supporting these forests are typically well-drained, gravelly, coarse-textured, acidic, and rarely formed from calcareous parent materials. These forests are dominated by lodgepole pine with shrub, grass, or barren understories. Sometimes there are intermingled mixed conifer/quaking aspen (*Populus tremuloides*) stands, with the latter occurring with inclusions of deeper, typically fine-textured soils. The shrub component may be conspicuous to absent; common species include Oregon grape, antelope bitterbrush (*Purshia tridentata*), white spiraea (*Spiraea betulifolia*), snowberry, and currant (*Ribes* spp.).

Rocky Mountain Subalpine Dry–Mesic Spruce-Fir Forest and Woodland covers 9,466 acres within the FOA. Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*) forests comprise a substantial part of the subalpine forests of the Rocky Mountains and the Intermountain region. They often represent the highest elevation forests in the area. Sites within this system are cold year-round, and precipitation is predominantly in the form of snow, which may persist until late summer. Snowpacks are deep and late-lying and summers are cool. Frost is possible almost all summer and may be common in restricted topographic basins and benches. Douglas-fir may persist in occurrences of this system for long periods without regeneration. Lodgepole pine is common in many occurrences, and patches of pure lodgepole pine are not uncommon, as well as mixed conifer/quaking aspen stands. Disturbance includes occasional blowdown, insect outbreaks, and stand-replacing fire.

Inter-Mountain Basins Aspen–Mixed Conifer Forest and Woodland covers 4,417 acres within the FOA. Occurrences are typically on gentle to steep slopes on any aspect but are often found on clay-rich soils in intermontane valleys. Soils are derived from alluvium, colluviums, and residuum from a variety of parent materials but most typically occur on sedimentary rocks. The tree canopy is composed of a mix of deciduous and coniferous species, codominated by quaking aspen and conifers, including Douglas-fir, subalpine fir, Engelmann spruce, lodgepole pine, and limber pine. As the occurrences age, quaking aspen is slowly reduced until the conifer species become dominant. Common shrubs include serviceberry (*Amelanchier alnifolia*), chokecherry (*Prunus virginiana*), snowberry, common juniper, Wood's rose (*Rosa woodsii*), and Oregon grape. Herbaceous species include California brome (*Bromus carinatus*), pinegrass, Geyer's sedge (*Carex geyeri*), bluegrass (*Poa* spp.), needlegrass (*Achnatherum* spp.), yarrow (*Achillea millefolium*), heart leaf arnica (*Arnica cordifolia*), geranium (*Geranium viscosissimum*), and lupine (*Lupinus argenteus*). Most occurrences at present represent a late-seral stage of aspen changing to a pure conifer occurrence.

Inter-Mountain Basins Alkaline Closed Depression covers 2,004 acres within the FOA. This ecological system occurs on sites that are seasonally to semi-permanently flooded, usually retaining water

into the growing season and drying completely only in drought years. Many are associated with hot and cold springs, located in basins with internal drainage. Soils are alkaline to saline clays with hardpans. Salt encrustations can occur on the surface and the soils have poor structure. Species that typify this system are salt-tolerant and halophytic species such as salt grass (*Distichlis spicata*), Sandberg's bluegrass (*Poa secunda*), marsh muhley (*Muhlenbergia racemosa*), creeping wildrye (*Leymus triticoides*), and arrowgrass (*Triglochin maritima*).

Rocky Mountain Alpine–Montane Wet Meadow covers 2,076 acres within the FOA. These are high-elevation communities found throughout the Rocky Mountains and Intermountain regions, dominated by herbaceous species found on wetter sites with very low-velocity surface and subsurface flows. They range in elevation from montane to alpine. These types occur as large meadows in montane or subalpine valleys, as narrow strips bordering ponds, lakes, and streams, and along toeslope seeps. They are typically found on flat areas or gentle slopes, but may also occur on sub-irrigated sites with slopes up to 10%. Soils of this system may be mineral or organic. In either case, soils show typical hydric soil characteristics, including high organic content. This system often occurs as a mosaic of several plant associations, often dominated by graminoids, including small winged sedge (*Carex microptera*), Nebraska sedge (*Carex nebrascensis*), water sedge (*Carex aquatilis*), tufted hairgrass (*Deschampsia caespitosa*), creeping spikerush (*Eleocharis palustris*), and rush (*Juncus* spp.). Often alpine dwarf-shrublands, especially those dominated by willows, are immediately adjacent to the wet meadows. Wet meadows are tightly associated with snowmelt and typically not subjected to high disturbance events such as flooding.

Inter-Mountain Basins Mixed Salt Desert Scrub covers 19,655 acres within the FOA. This ecological system includes open-canopied shrublands of typically saline basins, alluvial slopes, and plains across the Intermountain West. This system may be found in valleys, washes, lower slopes, and moderately drained flats. Substrates are often saline and calcareous, medium- to fine-textured, alkaline soils but also include some coarser-textured soils. The vegetation is characterized by a typically open to moderately dense shrubland composed of shadscale (*Atriplex confertifolia*), spiny hopsage (*Grayia spinosa*), winterfat (*Krascheninnikovia lanata*), and big sage (*Artemisia tridentata*). The herbaceous layer varies from sparse to moderately dense and is dominated by perennial graminoids such as Indian ricegrass (*Achnatherum hymenoides*), bluebunch wheatgrass (*Pseudoroegneria spicata*), western wheatgrass (*Pascopyrum smithii*), Sandburg's bluegrass, or sand dropseed (*Sporobolus airoides*). Various forbs are also present.

Great Basin Xeric Mixed Sagebrush Shrubland covers 297,623 acres within the FOA (including the corresponding fire-affected ecological systems shown in **Table 2-12**). This ecological system occurs on dry flats and plains, alluvial fans, rolling hills, rocky hillslopes, saddles, and ridges. Sites are dry, often exposed to desiccating winds, with typically shallow, rocky, non-saline soils. Shrublands are dominated by black sagebrush (*Artemisia nova*) or low sagebrush (*Artemisia arbuscula*) and may be codominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) or green rabbitbrush (*Chrysothamnus viscidiflorus*). Other shrubs that may be present include shadscale, spiny hopsage, and horsebrush (*Tetradymia canescens*). The herbaceous layer is often sparse and composed of perennial bunch grasses, such as bluebunch wheatgrass, Indian ricegrass, Thurber's needlegrass (*Achnatherum thurberianum*), squirreltail (*Elymus elymoides*), or Sandburg's bluegrass.

Inter-Mountain Basins Big Sagebrush Steppe covers 862,923 acres within the FOA (including the corresponding fire-affected ecological systems shown in **Table 2-12**). This ecological system occurs

throughout much of the Columbia Plateau and northern Great Basin. Soils are typically deep and non-saline, often with a microphytic crust. This shrub-steppe is dominated by perennial grasses and forbs (>25% cover) with basin big sage (*Artemisia tridentata* ssp. *tridentata*), Wyoming big sagebrush, threetip sage (*Artemisia tripartita*) or antelope bitterbrush dominating or codominating the open to moderately dense (10–40% cover) shrub layer. Shadscale, green rabbitbrush, horsebrush, or fringed sage (*Artemisia frigida*) may be common especially in disturbed stands. Cheatgrass (*Bromus tectorum*) is an indicator of disturbance. Associated graminoids include Indian ricegrass, thickspike wheatgrass (*Elymus lanceolatus*), junegrass (*Koeleria macrantha*), Sandburg's bluegrass, western wheatgrass, needle and thread grass (*Hesperostipa comata*), and bluebunch wheatgrass. Common forbs are Hood's phlox (*Phlox hoodii*), sandwort (*Arenaria* spp.), globe mallow (*Sphaeralcea coccinea*), and milkvetch (*Astragalus* spp.).

Inter-Mountain Basins Greasewood Flat covers 1,839 acres within the FOA. This ecological system occurs throughout much of the western U.S. in intermountain basins. It typically occurs near drainages on stream terraces and flats. Sites typically have saline soils, a shallow water table and flood intermittently, but remain dry for most growing seasons. The water table remains high enough to maintain vegetation, despite salt accumulations. This system usually occurs as a mosaic of multiple communities, with open to moderately dense shrublands dominated or codominated by greasewood (*Sarcobatus vermiculatus*). Other shrubs that may be present to codominant in some occurrences include shadscale, Wyoming big sagebrush, basin big sage, and winterfat. The herbaceous layer is usually dominated by graminoids.

Inter-Mountain Basins Montane Sagebrush Steppe covers 243,718 acres within the FOA (including the corresponding fire-affected ecological systems shown in **Table 2-12**). This ecological system includes sagebrush communities occurring at foothills to montane and subalpine elevations across the western U.S. Climate is cool, semi-arid to subhumid. This system primarily occurs on deep-soiled to stony flats, ridges, nearly flat ridgetops, and mountain slopes. In general, this system shows an affinity for mild topography, fine soils, zones of higher precipitation, and areas of snow accumulation. This is a diverse system composed primarily of mountain big sage (*Artemisia tridentata* ssp. *vaseyana*). Antelope bitterbrush may codominate or even dominate some stands. Low sagebrush dominated shrublands commonly occur within this system on rocky or windblown sites. Other common shrubs include snowberry, serviceberry, rubber rabbitbrush (*Ericameria nauseosa*), wax currant (*Ribes cereum*), and green rabbitbrush. Wyoming big sagebrush may be present to codominant. Most stands have an abundant perennial herbaceous layer (over 25% cover, in many cases over 50% cover). Common graminoids include Idaho fescue (*Festuca idahoensis*), needle and thread grass, slender wheatgrass (*Elymus trachycaulus*), California brome, Sandburg's bluegrass, spike fescue, bluebunch wheatgrass, Indian ricegrass, and Columbia needlegrass (*Achnatherum nelsonii*). In many areas, wildfires can maintain an open herbaceous-rich steppe condition, although at most sites, shrub cover can be unusually high for a steppe system (> 40%), with an equally high grass and forb cover.

Inter-Mountain Basins Active and Stabilized Dune covers 21,345 acres within the FOA. This ecological system occurs in the Intermountain West on basins, valleys, and plains. Often it is composed of a mosaic of migrating bare dunes, anchored dunes with sparse to moderately dense vegetation (< 10–30% canopy cover), and stabilized dunes. The system is defined by the presence of migrating dunes or, where the dunes are entirely anchored or stabilized, evidence that the substrate is eolian and not residual, that the vegetation is early or mid seral, and that the substrate is likely to become actively migrating again with disturbance or increased aridity. Species occupying these environments are often adapted to shifting,

coarse-textured substrates and form patchy or open grasslands, shrublands or steppe, and occasionally woodlands. Vegetation varies and may be composed of Indian ricegrass, basin big sage, green rabbitbrush, rubber rabbitbrush, needle and thread grass, and antelope bitterbrush. Herbaceous species are characteristic of early-seral vegetation through much of this system's range. Shrubs are commonly dominant on mid to late seral stands, and can be found at any stage.

Inter-Mountain Basins Cliff and Canyon covers 18,245 acres within the FOA. This ecological system is found from foothill to subalpine elevations and includes barren and sparsely vegetated landscapes (generally < 10% plant cover) of steep cliff faces, narrow canyons, and smaller rock outcrops of various igneous, sedimentary, and metamorphic bedrock types. Also included is vegetation of unstable scree and talus slopes that typically occurs below cliff faces. Widely scattered trees and shrubs may include limber pine, juniper, big sage, antelope bitterbrush, curl-leaf mountain mahogany (*Cercocarpus ledifolius,* also known as mountain mahogany), and other species often common in adjacent plant communities.

Inter-Mountain Basins Volcanic Rock and Cinder Land covers 141,192 acres within the FOA. This ecological system occurs in the Intermountain West and is limited to barren and sparsely vegetated volcanic substrates (generally < 10% plant cover) such as basalt lava, basalt dikes with associated colluvium, basalt cliff faces, tuff, cinder cones, or cinder fields. Vegetation is variable and includes a variety of species depending on local environmental conditions, such as elevation, age, and type of substrate. At montane and foothill elevations scattered limber pine and juniper trees may be present. Shrubs such as big sage and rubber rabbitbrush are often present on some lava flows and cinder fields.

Rocky Mountain Lower Montane–Foothill Riparian Woodland and Shrubland covers 3,538 acres within the FOA. This ecological system is found throughout the Rocky Mountain region. This system often occurs as a mosaic of multiple communities that are tree-dominated with a diverse shrub component. It is dependent on a natural hydrologic regime, especially annual to episodic flooding. Occurrences are found within the flood zone of rivers, on islands, sand or cobble bars, and immediate streambanks. It can form large, wide occurrences on mid-channel islands in larger rivers or narrow bands on small, rocky canyon tributaries and well-drained benches. Dominant trees may include cottonwood (*Populus angustifolia*), box elder, (*Acer negundo*), and Douglas-fir. Dominant shrubs include alder (*Alnus incana*), birch (*Betula occidentalis*), chokecherry, and snowberry. Generally, the upland vegetation surrounding this riparian system is different and ranges from grasslands to forests.

Rocky Mountain Subalpine–Montane Riparian Shrubland covers 3,174 acres within the FOA. This system is found throughout the Rocky Mountain region. These are montane to subalpine riparian shrublands occurring as narrow bands of shrubs lining streambanks and alluvial terraces in narrow to wide, low-gradient valley bottoms and floodplains with sinuous stream channels. Occurrences can also be found around seeps, fens, and isolated springs on hillslopes away from valley bottoms. Many of the plant associations found within this system are associated with beaver activity. This system often occurs as a mosaic of multiple communities that are shrub and herb dominated and includes above treeline, willow-dominated, snowmelt-fed basins that feed into streams. The dominant shrubs reflect the large elevational gradient and include Booth willow (*Salix boothii*), Geyer's willow (*Salix geyeri*), Bebb's willow (*Salix bebbiana*), Drummond's willow (*Salix drummondiana*), Wolf's willow (*Salix wolfii*) alder, birch, and chokecherry.

Inter-Mountain Basins Curl-leaf Mountain Mahogany Woodland and Shrubland covers 4,847 acres within the FOA. This ecological system occurs in hills and mountain ranges of the Intermountain West. It typically occurs on rocky outcrops or escarpments and most stands occur as shrublands on ridges and steep rimrock slopes, but they may be composed of small trees in steppe areas. Scattered junipers or pines may also occur. This system includes both woodlands and shrublands dominated by mountain mahogany, mountain sage, and antelope bitterbrush with species of currant and snowberry often present. Undergrowth is often very sparse and dominated by bunch grasses, usually bluebunch wheatgrass and Idaho fescue. Mountain mahogany is a slow-growing, drought-tolerant species that generally does not resprout after burning and needs the protection from fire that rocky sites provide.

Inter-Mountain Basins Juniper Savanna covers 14,417 acres within the FOA. This ecological system is found on lower mountain slopes, hills, plateaus, basins, and flats often where juniper is expanding into semi-desert grasslands and steppe. The vegetation is typically open savanna, although there may be inclusions of denser juniper woodlands. This savanna is typically dominated by Utah juniper (*Juniperus osteosperma*) trees with high cover of perennial bunch grasses and forbs, with needle and thread and bluebunch wheatgrass being most common.

Rocky Mountain Subalpine–Montane Limber–Bristlecone Pine Woodland covers 503 acres within the FOA. This ecological system occurs throughout the Rocky Mountains on dry, rocky ridges and slopes near upper treeline above the spruce-fir forest. Sites are harsh, exposed to desiccating winds, with rocky substrates and a short growing season that limits plant growth. Higher elevation occurrences are found well into the subalpine-alpine transition on wind blasted, mostly west-facing slopes and exposed ridges. The open tree canopy is often patchy and is strongly dominated by limber pine. Other trees such as juniper, lodgepole pine, and Douglas-fir are occasionally present. Mountain mahogany, Oregon grape, and antelope bitterbrush may form an open shrub layer in some stands. The herbaceous layer, if present, is generally sparse and composed of graminoids, such as Idaho fescue and bluebunch wheatgrass.

2.8.1. Indicators

Indicators of vegetation condition include acres affected by grazing, wildland fire, drought, wildlife, roads, mining, OHVs, and infestation of invasive species/noxious weeds. Indicators of noxious weed conditions in the area include the presence, extent, and density of occurrence. The diversity of noxious weed species may indicate the effectiveness of current management efforts or may reflect new pressures on the land. These indicators are derived from field observations, allotment evaluations, vegetation monitoring, stream surveys, noxious weed surveys, satellite mapping, and fire rehabilitation plans.

2.8.2. Current Condition

Lands shown in **Table 2-12** that are listed as non-native perennial grasslands are public lands that have been previously seeded by the BLM. Historically the majority of these public lands were seeded with varieties of crested wheatgrass (*Agropyron cristatum*). Many of the larger seedings in the FO were planted in the 1960s and ‘70s and the seedings vary from areas with near monocultures of crested wheatgrass to areas with a dense canopy cover of big sagebrush and a limited understory of crested wheatgrass. Several of the seedings presently have a mixture of crested wheatgrass, native grasses, forbs, and shrubs.

As shown in **Table 2-12**, approximately 2,000 acres of the PA are presently classified as annual grasslands with the dominant vegetation in these areas being cheatgrass.

Primary impacts on vegetative communities are caused by continued drought, wildland fire, recreation use, OHV travel, grazing (by livestock or wildlife), and invasive species/noxious weeds. The overall effect of fire in vegetative communities is to reduce the cover of trees and shrubs and to increase the abundance of herbaceous plants. Where adequate seed source is present, fire and other disturbances may result in an increase in invasive species/noxious weeds, particularly cheatgrass. The increased cover and more continuous fuel load of cheatgrass may increase the frequency and intensity of wildland fire, and thus over time intensify the loss of native vegetation. Because most species of sagebrush may be killed by fire and do not resprout, they may return only very slowly to large burned areas. Cheatgrass can be a dominant factor in the fire regime and potentially influence fire dynamics in sagebrush-dominated ecological systems.

Recreation use, including OHV travel, causes localized ground disturbance that can lead to an increase in invasive species/noxious weeds, and recreation travel can be a vector for distribution of these seeds. Grazing by both domestic livestock and wildlife can cause localized ground disturbance and a corresponding increase in invasive species/noxious weeds. Selective grazing by livestock can also result in an increase in shrub cover.

Vegetation Cover Types

For management purposes and NEPA analysis during this land use planning process the NVCS types for the PA were combined into vegetation cover types. These vegetation cover types can be correlated to one or more vegetative divisions, which are made up of one or more ecological systems that were previously presented. For example, the riparian–wetland vegetative cover type is a combination of three divisions. In particular, the evergreen semi-desert shrubland and the deciduous semi-desert shrubland divisions have been broken down into cover types for ease of development of management direction during the planning process. In all, the ten cover types that will be addressed in the planning process are presented below. Acreages for the cover types are shown in **Table 2-13.**

- **Evergreen Forest** is the Middle Rocky Mountain Montane Douglas-fir Forest and Woodland Ecological System, the Rocky Mountain Lodgepole Pine Forest Ecological System, and the Rocky Mountain Subalpine Dry–Mesic Spruce-Fir Forest and Woodland Ecological System.
- **Evergreen Woodland** is the Inter-Mountain Basins Juniper Savanna Ecological System and the Rocky Mountain Subalpine–Montane Limber–Bristlecone Pine Woodland Ecological System.
- **Low Sagebrush** is the Great Basin Xeric Mixed Sagebrush Shrubland Ecological System (including the Evergreen Shrubland Division and Perennial Grassland Division).
- **Mixed Evergreen Deciduous Forest** is the Inter-Mountain Basins Aspen–Mixed Conifer Forest and Woodland Ecological System.
- **Mountain Mahogany** is the Inter-Mountain Basins Curl-leaf Mountain Mahogany Woodland and Shrubland Ecological System.
- **Mountain Sagebrush** is the Inter-Mountain Basins Montane Sagebrush Steppe Ecological System (including the Evergreen Shrubland Division and Perennial Grassland Division).

- **Riparian–Wetlands** is the Rocky Mountain Lower Montane–Foothill Riparian Woodland and Shrubland Ecological System, Rocky Mountain Subalpine–Montane Riparian Shrubland Ecological System, Inter-Mountain Basins Alkaline Closed Depression Ecological System, and the Rocky Mountain Alpine–Montane Wet Meadow.
- **Salt Desert Shrub** is the Inter-Mountain Basins Greasewood Flat Ecological System, and the Inter-Mountain Basins Mixed Salt Desert Shrub Ecological System.
- **Vegetated Rock** is the Inter-Mountain Basins Active and Stabilized Dune Ecological System, Inter-Mountain Basins Volcanic Rock and Cinder Land Ecological System, Inter-Mountain Basins Cliff and Canyon Ecological System.
- **Wyoming Basin Sagebrush** is the Inter-Mountain Basins Big Sagebrush Steppe Ecological System (including the Evergreen Shrubland Division and Perennial Grassland Division), the Non-Native Perennial Grassland Ecological System, and the *Bromus tectorum* Semi-Natural Herbaceous Alliance.

Table 2-13. Vegetation types and acreages in the Upper Snake FOA.

Cover Type Name	Acres
Evergreen Forest	26,019
Evergreen Woodland	14,920
Low Sagebrush	297,623
Mixed Evergreen Deciduous Forest	4,417
Mountain Mahogany	4,847
Mountain Sagebrush	243,718
Riparian–Wetlands	10,792
Salt Desert Shrub	21,494
Vegetated Rock	180,782
Wyoming Basin Sagebrush	1,001,897
Non-vegetated Areas (water and industrial)	3,131
Total	1,809,640

Invasive Species/Noxious Weeds

There are many ways to define a weed, as basically, any plant that interferes with management objectives for a given area at a given point in time may be considered a weed. Weeds that interfere with management objectives for the Upper Snake FO are termed invasive species/noxious weeds and affect all resources that depend, to some degree, on vegetation.

Invasive species/noxious weeds include plants that are not native to the U.S. or the PA. The primary invasive species in the FOA is cheatgrass, which is replacing native vegetation. Cheatgrass has also disrupted the natural fire cycle by creating fuels that burn more often and at a different time of year than natural vegetation.

Noxious weeds are spreading across the western U.S., and southeastern Idaho is no exception. Many state and county government agencies in the west have designated noxious weed lists. The Idaho Department

of Agriculture maintains the Idaho State Noxious Weed List, which includes 57 different species of weeds that are designated noxious by state law. As shown in **Table 2-14**, of these 57 species, 10 are commonly found on public lands managed by the Upper Snake FO.

Table 2-14. Noxious weeds commonly found in the Upper Snake FOA.

Common Name	Scientific Name	Infested Area
Black Henbane	*Hyoscyamus nigar*	Medicine Lodge
Canada Thistle	*Cirsium arvense*	Scattered throughout
Field Bindweed	*Convolvulus arvensis*	Big desert roads
Houndstongue	*Cynoglossum officinale*	South Fork Snake River
Leafy Spurge	*Euphorbia esula*	Medicine Lodge, Big Lost
Musk Thistle	*Carduus nutans*	Scattered throughout
Rush Skeletonweed	*Chondrilla juncea*	Big Desert, Southwest
Russian Knapweed	*Acroptilon repens*	Roberts, Menan
Spotted Knapweed	*Centaurea maculosa*	Snake River, Birch Creek
White top	*Carddaria draba*	Snake River, Big Butte

The BLM has a major role in the success or failure of weed management in southeastern Idaho and therefore has made weed management a priority. Cooperation with federal, state, county, and private land owners is critical for the success of weed management plans. The Upper Snake FO is actively participating in four cooperative weed management area groups and has active agreements with all 13 counties within the PA. The Upper Snake FO has implemented an integraded pest management plan for the management of invasive species/noxious weeds. Weeds treatments are conducted under the FO's fuels program, which is discussed in **Section 2.17**, Wildland Fire Ecology and Management.

2.8.3. Trends

Vegetation diversity has been impacted by wildfire, drought, invasive species/noxious weeds, increased recreation use, and livestock grazing. The Wyoming basin sagebrush community has been notably impacted by wildfire since the mid 1990s.

Invasive species/noxious weeds populations in many areas continue to expand and new weed species continue to appear in the FOA. Leafy spurge and knapweed have been particularly difficult to control. However, some biological control treatments have been effective at reducing leafy spurge and knapweed.

2.8.4. Forecast

Wildfires, invasive species/noxious weeds continue to be significant threats to vegetative diversity in the FOA. The potential decline in vegetative diversity may be mitigated by effective fuels, rehabilitation, grazing, and recreation management.

2.8.5. Key Features

Key features of the upland vegetation are the inter-mountain basins big sagebrush steppe and inter-mountain basins montane sagebrush steppe ecological systems. These plant communities encompass approximately one half of the PA and are important habitats for sensitive sagebrush obligate species such as the greater sage-grouse (*Centrocercus urophasianus*). The Big Desert, located in the southwest end of the PA, is an important large undeveloped sagebrush steppe. Recent wildfires in this area have altered the composition of vegetation with a substantial reduction in Wyoming basin sagebrush cover. The Sand Creek area, located in the northeast end of the planning unit, is a relatively intact example of a montane sagebrush steppe dominated by mountain sagebrush and antelope bitterbrush. This area is important habitat for sagebrush obligates as well as important winter range for several big game species.

2.9. Vegetation—Riparian Habitats and Wetlands

2.9.1. Indicators

When assessing the current and desired future conditions of riparian–wetland ecological systems, the following indicators of condition are used:

- percentage of lotic riparian areas (flowing water systems) determined to be in PFC or making progress toward PFC,
- percentage of lentic wetland areas (still water systems) determined to be in PFC, and
- percentage of long- and short-term indicators of riparian–wetland vegetation, streambank, and stream channel conditions that are achieving or making progress towards desired conditions as determined by the multiple indicator method (MIM) protocol.
- These indicators also provide a means of comparison among the various riparian habitats and wetlands across the Upper Snake FOA to help prioritize needed management actions.

2.9.2. Current Condition

The terms "riparian" and "wetland" are used here to include both lotic and lentic systems. Lotic riparian areas are those ecosystems associated with running waters, streams, or drainages, while lentic wetland areas are those associated with standing water ecosystems, such as lakes, reservoirs, vegetated playas, meadows, springs, seeps, low velocity backwater areas, or areas where permanent soil moisture is available.

Riparian and wetland ecological systems comprise less than 1% of the Upper Snake FOA but are among the most important, productive, and diverse ecosystems on the landscape. Riparian–wetland ecosystems are essential to the human and natural environment because they impart the following benefits:

- maintaining clean renewable water supplies,
- providing for diverse plant and wildlife ecosystems, including special status species and fisheries,
- providing important cultural and historic values,
- generating economic value derived from sustainable uses (open space, hunting, livestock grazing, commercial recreation),
- providing greenbelt-associated recreation and scenic values, and
- providing thermal/shade protection for both humans and wildlife.

Healthy riparian–wetland systems filter and purify water as it moves through the riparian zone, reduce sediment loads, enhance soil stability, reduce destructive energies associated with flood events, provide physical and thermal micro-climates that contrast with surrounding uplands, and contribute to groundwater recharge and base flow.

Riparian–wetland areas provide important habitat components for wildlife including green forage, insects, drinking water, nesting, cover and thermal protection. Green forage is especially important for many wildlife species during the summer and fall when upland vegetation has dried out. Trees and shrubs provide vertical structure for neo-tropical birds. As the trees age and decay, cavity nesters make use of

them. Leaves supply nutrients to the riparian–wetland and aquatic system. In some areas, these leaves can be the driving force as a food source for aquatic macro invertebrates and, therefore, for native fish. The structure, food, and water provided by these communities make them the most diverse and productive wildlife habitat in the PA.

Where site potential allows, vegetation may develop multiple canopies, including trees, shrubs, grasses, forbs, sedges, and rushes. This complex vegetation structure is the goal of riparian–wetland management and can provide exceptionally valuable habitat for a wide array of wildlife species. However, even riparian–wetland areas dominated by herbaceous communities and lacking complex structure are important as sources of water and food for wildlife.

Water is a significant cultural and spiritual resource that provides life-giving qualities to the environment and provides sustenance to the Shoshone–Bannock people. No other landscape feature connects ecosystems as effectively as riparian–wetland areas. For example, hot and cold springs provide healing waters; cottonwood trees and willows are among the many plants used for medicinal and spiritual purposes; and riparian–wetland areas provide habitat for terrestrial and aquatic species (Shoshone–Bannock Tribes 2009a).

Riparian–wetland areas are highly favored by grazing livestock for forage, drinking water, and thermal cover. This circumstance has led to extreme disturbance of this habitat type in some areas. Riparian–wetland habitats are fragile resources and are often among the first landscape features to reflect impacts from management activities. As such, these habitats are often used as indicators of overall land health and watershed condition.

Lotic riparian communities occur along the major watercourses in the valleys of the PA and in association with isolated springs, seeps, and smaller streams. Lotic systems occur primarily as deciduous stands of trees and shrubs dominated by various mixtures of willow (*Salix* spp.), cottonwood, quaking aspen, water birch (*Betula occidentalis*), and red-osier dogwood (*Cornus stolonifera*). A mosaic of herbaceous species including sedge (*Carex* spp.), rush, and various other graminoids and forbs occurs along the riparian margin. These woodlands and shrublands require periodic flooding and bare, moist substrates for reestablishment.

Riparian areas in lotic sites include 9,507 acres along approximately 470 mi of rivers and streams, and wetland areas in lentic sites include 358 acres within the Upper Snake FOA. Although this is a small percentage of the FOA, the importance of these areas as wildlife habitat far exceeds their size. **Table 2-15** provides a list of riparian–wetland habitat and community types in the Upper Snake FOA (Hansen and Hall 2002, Ecological Solutions Group 2009).

Lentic wetland areas are commonly found independently of a defined stream channel and may occur at various elevations and in diverse landscape settings. This is particularly true for meadows, springs, and seeps, which may be present within very arid areas and at low elevations. Lentic systems are typically small, and while they are extremely important ecologically, most springs and seeps within the FOA typically average less than 0.2 acre in size.

Table 2-15. Riparian–wetland habitat and community types for lotic and lentic sites within the FOA.

Type[a]	Scientific Name	Common Name	FOA (Acres)
HT	*Abies lasiocarpa/Actaea rubra*	Subalpine fir/Baneberry	3.17
HT	*Abies lasiocarpa/Calamagrostis canadensis*	Subalpine fir/Bluejoint reedgrass	0.06
HT	*Abies lasiocarpa/Steptopus amplexifolius*	Subalpine fir/Clasping-leaved twisted-stalk	13.42
CT	*Agrostis stolonifera*	Redtop	26.91
CT	*Alnus incana*	Mountain alder	19.16
HT	*Betula glandulosa/Carex utriculata*	Bog birch/Carex utriculata	232.19
CT	*Betula occidentalis*	Water birch	135.89
CT	*Bromus inermis*	Smooth brome	18.43
HT	*Carex aquatilis*	Water sedge	4.09
CT	*Carex nebrascensis*	Nebraska sedge	103.80
HT	*Carex utriculata*	Beaked sedge	761.85
CT	*Cornus stolonifera*	Red-osier dogwood	80.61
CT	*Crataegus succulenta*	Succulent hawthorn	14.95
HT	*Deschampsia cespitosa*	Tufted hairgrass	34.90
HT	*Eleocharis palustris*	Common spikesedge	90.80
HT	*Glyceria grandis*	American mannagrass	1.04
CT	*Glycyrrhiza lepidota*	American licorice	0.37
CT	*Juncus balticus*	Baltic rush	800.78
HT	*Juniperus spp./Cornus stolonifera*	Rocky Mountain juniper/Red-osier dogwood	649.51
HT	*Pascopyrum smithii*	Western wheatgrass	17.02
HT	*Phalaris arundinacea*	Reed canarygrass	154.32
CT	*Picea spp./Calamagrostis canadensis*	Spruce/Bluejoint reedgrass	1.16
HT	*Picea spp./Cornus stolonifera*	Spruce/Red-osier dogwood	236.40
HT	*Picea spp./Equisetum arvense*	Spruce/Common horsetail	14.71
CT	*Poa pratensis*	Kentucky bluegrass	1,282.30
CT	*Populus angustifolia/Cornus stolonifera*	Narrowleaf cottonwood/Red-osier dogwood	72.07
CT	*Populus angustifolia/Herbaceous*	Narrowleaf cottonwood/Herbaceous	81.16
CT	*Populus angustifolia/Recent alluvial bar*	Narrowleaf cottonwood/Recent alluvial bar	43.57
CT	*Populus deltoides/Herbaceous*	Great plains cottonwood/Herbaceous	2.93
CT	*Populus deltoides/Recent alluvial bar*	Great plains cottonwood/Recent alluvial bar	2.93
HT	*Populus tremuloides/Calamagrostis canadensis*	Quaking aspen/Bluejoint reedgrass	0.85

Type[a]	Scientific Name	Common Name	FOA (Acres)
HT	*Populus tremuloides/Cornus stolonifera*	Quaking aspen/Red-osier dogwood	1,038.40
CT	*Populus tremuloides/Herbaceous*	Quaking aspen/Herbaceous	42.84
HT	*Populus tremuloides/Osmorhiza occidentalis*	Quaking aspen/Western sweet-cicely	0.55
CT	*Populus tremuloides/Poa pratensis*	Quaking aspen/Kentucky bluegrass	7.20
CT	*Populus trichocarpa/Cornus stolonifera*	Black cottonwood/Red-osier dogwood	47.47
CT	*Populus trichocarpa/Herbaceous*	Black cottonwood/Herbaceous	3.54
CT	*Populus trichocarpa/Recent alluvial bar*	Black cottonwood/Recent alluvial bar	52.97
CT	*Populus trichocarpa/Symphoricarpos occidentalis*	Black cottonwood/Western snowberry	0.49
HT	*Potentilla fruticosa/Deschampsia cespitosa*	Shrubby cinquefoil/Tufted hairgrass	41.25
CT	*Prunus virginiana*	Common chokecherry	29.23
HT	*Pseudotsuga menziesii/Cornus stolonifera*	Douglas fir/Red-osier dogwood	358.81
CT	*Rosa woodsii*	Woods rose	36.25
CT	*Salix bebbiana*	Bebb willow	73.10
HT	*Salix drummondiana/Carex utriculata*	Drummond willow/Beaked sedge	14.10
CT	*Salix exigua*	Coyote willow	521.37
CT	*Salix geyeriana*	Geyer willow	228.95
HT	*Salix geyeriana/Calamagrostis canadensis*	Geyer willow/Bluejoint reedgrass	2.75
HT	*Salix geyeriana/Carex utriculata*	Geyer willow/Beaked sedge	1,876.04
CT	*Salix lasiandra*	Pacific willow	17.94
CT	*Salix lutea*	Yellow willow	74.51
HT	*Salix lutea/Carex utriculata*	Yellow willow/Beaked sedge	72.19
HT	*Schoenoplectus acutus*	Hardstem bulrush	5.19
HT	*Scirpus pungens*	Sharp bulrush	11.96
CT	*Symphoricarpos occidentalis*	Western snowberry	24.96
HT	*Typha latifolia*	Common cattail	18.61
–	Unclassified wetland type	Unclassified wetland type	280.03
–	Upland type	Upland type	67.31
Total riparian–wetland acres			9,849.34

a. HT = habitat type, CT = community type

Meadow habitats are vulnerable to grazing and other surface-disturbing uses that affect soil stability, water-holding capacity, and plant composition. All meadows are important watershed components that may be functionally impaired by gullies, sagebrush encroachment, and dominance by such species as iris (*Iris* spp.), which provides greatly diminished wildlife habitat values and indicates poor habitat health.

Where adequate site potential exists, vegetation associated with reservoirs or lakes commonly provides valuable nesting and brood-rearing habitat for waterfowl and shorebirds. Common vegetation associated with these types of wetlands includes willow, sedge, rush, spikerush (*Eleocharis* spp.), bulrush (*Scirpus* spp.), and cattail (*Typha angustifolia*). Several species of amphibians, birds, and reptiles tend to associate with these areas.

Springs and seeps occur where ground water approaches the surface. Many springs flow directly into streams, but others form small isolated ponds or marshy areas. Springs and seeps may also form channels to flowing streams, or they may lose their surface expression and recharge alluvial fill material or permeable strata. Springs and seeps are important to lotic habitats because of the perennial base flow they provide to streams.

Depending on soil and topography, extensive riparian–wetland areas may be associated with spring sources. Because of the continuous flow and constant temperature of most springs, riparian–wetland communities frequently remain permanently green, providing habitat, thermal and escape cover, and forage for wildlife throughout the year. The condition of lentic systems is typically linked to their spatial location on the landscape, site characteristics, surrounding topography, and the type/season of grazing that is occurring.

PFC Method and Inventory

In 1996, the BLM and the USFS agreed to accelerate cooperative riparian–wetland restoration management. Part of this effort defined PFC as a BLM minimum health standard for riparian–wetland areas to gauge whether a riparian–wetland system has adequate vegetation, landforms, or large woody debris to perform essential flood control, water quality, erosion control, and habitat functions. The PFC method has also been used to define the riparian–wetland standard in the Idaho Standards for Rangeland Health (BLM 1997a).

Riparian–wetland functionality in the Upper Snake FOA has been intensively studied since 1992 when Dr. Paul Hansen of the Montana Riparian and Wetland Association developed inventory and survey methods for determining lotic and lentic PFC. These methods, which pre-date the development of the BLM PFC checklist, have been widely used in the western United States and in Canada by many federal, state, and private organizations. These methods go over and above the standard BLM checklist for determining PFC because, instead of merely documenting presence/absence of a particular stream parameter, the methods score each parameter based on a range of percentages that are taken into account in the final scoring.

A baseline PFC inventory of small rivers and streams within the Upper Snake FOA was completed in the early 1990s. An inventory of the large river systems (South Fork, Henry's Fork, and main stem of the Snake River) was completed in the late 1990s. An extensive inventory of springs, their condition, and water yield to streams was conducted in the late 1980s and early 1990s. Although the inventory pre-dated the development of the PFC method currently used by Upper Snake FO staff, the data have been extrapolated to estimate PFC. Inventories and/or surveys using the PFC method have been completed on approximately 40% of the lentic sites in the Upper Snake FOA.

The inventory data and subsequent surveys conducted by BLM personnel are currently maintained by the Ecological Solutions Group on a website that is available to the public (Ecological Solutions Group

2009). Although PFC is what BLM strives for along rivers and streams, certain factors affecting function of the lotic system (e.g., natural limitations, external actions) may be outside of BLM's management influence. For instance, as a result of the altered flow regime caused by Palisades Dam and irrigation diversion withdrawals, the highest attainable riparian–wetland health on the South Fork of the Snake River may be less than desired.

BLM uses three rating categories to describe the functioning condition of a particular river reach. A definition of each follows (BLM 1998a,b,c).

PFC (Healthy)
Riparian–wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to:

- dissipate stream energy associated with high waterflow; thereby reducing erosion and improving water quality,
- filter sediment, capture bedload, and aid floodplain development,
- improve flood-water retention and ground water recharge,
- develop root masses that stabilize streambanks against cutting action,
- develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses, and
- support greater biodiversity.

Riparian–wetland areas are functioning properly when there is adequate structure present to provide the listed benefits applicable to a particular area. The analysis must be based on the area's capability and potential. However, even though a riparian area is at PFC, other resources (i.e., fisheries habitat) may not be meeting objectives.

Functional at Risk (Healthy, but with problems)
Riparian–wetland areas that are in functional condition, but an existing soil, water, or vegetation attribute makes them susceptible to trending downward (toward nonfunctional).

Nonfunctional (Unhealthy)
Riparian–wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows, and thus are not reducing erosion, improving water quality, etc., as previously listed. The absence of certain physical attributes such as a floodplain where one should be is an indicator of nonfunctional conditions.

The PFC method used by the Upper Snake FO to determine riparian–wetland health uses a point scale to represent a range of conditions for each factor (or attribute) assessed. Vegetation and soil/hydrology are tallied separately, but the overall score represents a combination of the two. The PFC method also integrates stability considerations of the streambank, channel bed, and floodplain. In accordance with the Idaho Standards for Rangeland Health, riparian–wetland areas that fail to meet or make progress toward PFC (based on site capability) as a result of current livestock grazing must undergo management changes (e.g., reducing livestock numbers, varying season of use, fencing, salting, developing alternative water

sources) to aid in the recovery of these areas. Upper Snake FO staff use PFC surveys to aid in prioritizing more site-specific, quantitative monitoring using the MIM protocol. Table 2-16 presents PFC categories and their associated ranges.

Table 2-17 and **Table 2-18** provide summary data of current lotic and lentic PFC conditions in the Upper Snake FOA.

Table 2-16. PFC method categories and associated ranges.

PFC Method Category	Range (%)
Proper Functioning Condition (Healthy)	80–100
Functional At Risk (Healthy, but with problems)	60–79
Nonfunctional (Unhealthy)	< 60

Table 2-17. Lotic PFC summary of current riparian conditions in the Upper Snake FOA.

Measure	Proper Functioning Condition	Functional at Risk			Nonfunctional	Total
		Upward Trend	Trend Not Apparent[a]	Downward Trend		
Stream/River Miles	162	54	173	8	73	470
(Percent of Total)	(34)	(11)	(37)	(2)	(16)	
Acres	1,926	302	6,835	21	415	9,507
(Percent of Total)	(20)	(3)	(72)	(0.2)	(4)	

a. Trend not apparent is indicated when a riparian–wetland area has been surveyed only once. Without subsequent surveys, trend toward or away from PFC cannot be determined.

Table 2-18. Lentic PFC summary of current wetland conditions in the Upper Snake FOA.

Measure	Proper Functioning Condition	Functional at Risk			Nonfunctional	Total
		Upward Trend	Trend Not Apparent[a]	Downward Trend		
Acres Inventoried	64	19	31	4	39	157
(Percent of Total)	(41)	(12)	(20)	(3)	(25)	
Acres Not Inventoried—estimated values	47	0	169	0	0	216
(Percent of Total)	(22)	(0)	(78)	(0)	(0)	
Total (Percent)	111	19	200	4	39	373
	(30)	(5)	(54)	(1)	(10)	(100)

a. Trend not apparent is indicated when a riparian–wetland area has been surveyed only once. Without subsequent surveys, trend toward or away from PFC cannot be determined.

MIM

In 2004, the Idaho BLM State Office began to develop the MIM protocol to provide an efficient and effective approach to monitoring streams and riparian vegetation. The protocol is used to evaluate current livestock grazing management practices, i.e., timing, frequency, and duration of grazing, and to determine whether the vegetation, stream channels, and streambanks are responding to livestock grazing management as anticipated. While the MIM protocol was initiated as a result of grazing management concerns, the long-term monitoring techniques provide useful information regarding the general condition and trend of streams and riparian vegetation regardless of the kind of management activities occurring on the site (Burton, Cowley, and Smith 2008). As a result, the MIM monitoring protocol facilitates adaptive management by providing data to refine and make annual changes to livestock grazing management practices to meet long-term management objectives. The protocol's latest version was released in 2008, and while data is currently available for only a small number of streams, the Upper Snake FO is actively gathering additional MIM data on a number of streams that have undergone management changes.

The MIM monitoring protocol addresses ten procedures that can be used to monitor streams and associated riparian vegetation. The following seven procedures provide indicators for long-term (trend) monitoring:

- modified greenline (Winward 2000),
- modified woody species regeneration (Winward 2000),
- streambank stability (Henderson et al. 2004),
- greenline-to-greenline channel width (Burton, Cowley, and Smith 2008),
- maximum water depth (Henderson et al. 2004),
- water width (Henderson et al. 2004), and
- substrate composition (Bunte and Apt 2002).

These seven procedures provide indicator data to assess the current condition and trend of the streambanks, channels, and vegetation. They also help to determine if local livestock grazing management strategies and actions are achieving the long-term goals and objectives for stream riparian vegetation and aquatic resources. Monitoring procedures for vegetation include modifications of greenline vegetation composition and woody species regeneration described by Winward (2000) and Coles-Ritchie and others (2004). Streambank stability is a modification of the effectiveness monitoring method described by Henderson and others (2004). The authors devised greenline-to-greenline width measurement. Stream depth, width, and substrate parameters are also measured at transects according to methods described by Henderson and others (2004).

Three additional procedures provide indicator data to help determine whether the current season's livestock grazing is meeting the criteria established to make progress toward meeting resource objectives. The three procedures include the following:

- modified landscape appearance for livestock use on woody plants (browse) (BLM 1996a),
- modified residual vegetation (stubble height) (BLM 1996a, BLM 1999a), and
- streambank alteration (Cowley 2004).

2.9.3. Trends

Field data from PFC studies throughout the Upper Snake FOA since 1992 indicate that overall trends in riparian–wetland habitats have been improving. For example, since 2001, the percentage of lotic miles in PFC has increased by 11%, while nonfunctional miles have decreased by 10%. Also since 2001, lentic acres in PFC have increased by 16%, and nonfunctional acres have decreased by 9%.

Table 2-19 provides a summary of trends, as of 2009, for both lotic and lentic habitats. The lentic trend information includes only those sites (approximately 142 acres) that have been inventoried using the PFC method developed by Hansen and Hall (2002).

Table 2-19. Summary of PFC trends within the Upper Snake FOA.

Trend	Lotic Miles (%)	Lentic Acres (%)
Upward (improving)	28	21
Downward (not improving)	7	13
Static (unchanged)	13	28
Trend not apparent[a]	52	38
Total	100	100

a. Trend not apparent is indicated when a riparian–wetland area has been surveyed only once. Without subsequent surveys, trend toward or away from PFC cannot be determined.

Since the early 1990s, the overall trend in the condition of lotic and lentic riparian–wetland areas in the FOA is toward PFC. This overall assessment considers impacts to riparian–wetland areas as a result of invasive nonnative species, spring system development to facilitate water capture/removal, and improvements resulting from changes in land management. The majority of spring developments in the FOA contain float systems that prevent the depletion of water from spring sources, thus providing for maintenance of the wetland community.

Reducing the duration of livestock grazing and changing the emphasis of grazing to more cool season use has resulted in substantial improvements in riparian–wetland condition. Some areas have been excluded from livestock grazing altogether. Some areas are declining with respect to invasive species but improving with respect to other indicators. However, under the Upper Snake FO's weed control program, the spread of noxious weeds along many streams has declined dramatically.

Livestock have a tendency to impact perched lentic wetland systems, but are not as likely to have major effects on areas with woody vegetation. Lentic systems at PFC or making progress toward PFC are typically inaccessible to livestock, or the livestock grazing system in place focuses on improvement of riparian–wetland habitats.

2.9.4. Forecast

Overall, the current trend of gradual improvement is likely to continue, provided that reduction of hot-season livestock grazing in riparian–wetland areas continues and that grazing seasons in riparian–wetland

areas continue to be of short duration. The trend of decreased distribution and abundance of invasive species/noxious weeds is likely to continue as they are moderated by control efforts.

2.9.5. Key Features

The main stem of the Snake River, the South Fork of the Snake River, the Henry's Fork of the Snake River, and the Teton River are the four major rivers that flow through the Upper Snake PA. Smaller rivers include the Little Lost, Big Lost, Falls, and Warm Rivers. These rivers and their tributary streams flow through about 470 mi of the Upper Snake FOA. Several hundred lentic sites are scattered throughout the PA.

Of the five species identified by the USFWS as endangered, threatened, or candidate under the ESA (16 U.S.C. 35 § 1531 et seq.) within the PA, the bull trout, Utah valvata snail, Ute ladies'-tresses, and yellow-billed cuckoo rely on the FOA riparian–wetland areas for their survival.

2.10. Special Status Species—Plants

Special status plant species include threatened and endangered (T&E), candidate, proposed, state-listed, and BLM sensitive species that are designated by federal and state agencies (BLM 2008c).

There are currently 48 special status plants that are known to occupy or have potential habitat within the Upper Snake FOA. Of these 48 species, 1 is federally listed as threatened, 8 are listed as species of concern for the State of Idaho, and the remaining 39 are listed by the BLM as sensitive species.

Ute ladies'-tresses is listed as threatened under the ESA. To monitor this species, their occurrences are defined as a population when at least one reproductively viably individual has been documented to occur in a given location. Under this definition, there are 27 known populations within the Upper Snake PA, with 17 of those populations occurring within the FOA, primarily along the South and the Henry's Forks of the Snake River.

2.10.1. Indicators

Habitat indicators can include density of weeds, introduced plants, the percentage of the site impacted by activity (i.e., recreational use, grazing, browse, hoof impacts, trailing), and the height of stubble remaining after livestock grazing. Other attributes that might be used include threats-based attributes, indicator species, or abiotic variables. Some species are so poorly known it may be difficult to identify appropriate parameters to then use as indicators. In these cases, habitat integrity monitoring can be used as a surrogate method to determine health of the habitat (BLM and the Nature Conservancy 1998).

2.10.2. Current Condition

Partnerships have been one avenue to collect rare plant information throughout the FOA. The IDFG Idaho Conservation Data Center (IDCDC) inventoried the Medicine Lodge drainage in 2005 (Mancuso 2006) and the Little Lost/Birch Creek Valleys in 2008 for rare plants. Inventories are planned for the remainder of the Upper Snake FOA through partnerships.

Inventory and monitoring have been performed on the South Fork of the Snake River specifically for Ute ladies'-tresses and expanded to include additional inventory of the river corridor for other rare plants. The Henry's Fork and Main Snake River have also been inventoried for Ute ladies'-tresses. Incidental inventories conducted by professional and academic personnel have added to the current knowledge for rare plant occurrences in the FOA.

When rare species are identified in Idaho they are evaluated for conservation by the Idaho Native Plant Society at the annual Idaho Rare Plant Conference. These species of conservation concern may then be added to the Idaho Rare Plant list to encourage the gathering of more information about their population sizes, distribution, life history, and threats.

The potential for species to be identified continues as new species are discovered, extirpated species are rediscovered (e.g., Rydberg's spring beauty [*Claytonia multiscapa*] rediscovered in 2008), or other species of concern are recommended by the Idaho Native Plant Society and adopted by the state of Idaho.

Appendix B, Idaho BLM Special Status Species Ranking Protocols 2003, goes into detail about the rankings, or classifications, of special status species. **Table 2-20** presents the special status plant species in the Upper Snake FOA and includes the IDCDC and Idaho Native Plant Society (INPS) rankings (see **Appendix B**). The following classifications of species should be taken into consideration for conservation: BLM type 1 (endangered, threatened, or candidate), BLM type 2 (high endangerment), and state-designated S1 (in danger of becoming extinct) and S2 (likely to be S1). **Table 2-21** presents distribution of special status plant species by habitat and location.

Table 2-20. Upper Snake FOA special status plant species as of May 2009.

Common Name[a]	Scientific Name	Idaho Conservation Data Center Rankings[b]	Idaho Native Plant Society Ranking[b]	BLM Type[b]
Alkali Primrose	*Primula alcalina*	G2, S2	GP2	2
Blue Gramma	*Bouteloua gracilis*	G5, S2	1	3
Bugleg Goldenweed	*Haplopappus insecticruris*	G3, S3	3	3
Bulb-bearing Waterhemlock	*Cicuta bulbifera*	G5, S2	S	5
Challis Crazyweed	*Oxytropis besseyi var. salmonensis*	G5, T3, S3	GP3	3
Cushion Cactus	*Coryphanta vivipara*	G5, S2	S	4
Earth Lichen	*Hetrocatapyrenium congestum*	G4, S2	S	4
False Mountain Willow	*Salix pseudomonticola*	G4, G5, S1	2	3
Giant Helleborine	*Epipactis gigantea*	G3, G4, S3	2	3
Gray Willow	*Salix glauca*	G5, S2	2	4
Green Keeled Cotton-grass	*Eriophorum viridicarinatum*	G5, S2	1	3
Green Needlegrass	*Nassella viridula = Stipa viridula*	G5, S2	R	3
Hall's moss	*Orthotrichum halli*	G4, S1	1	3
Hall's Rush	*Juncus hallii*	G4, G5, S2	R	5
Hoary Willow	*Salix candida*	G5, S2	S	4
Ibapah springparsley	*Cymopterus ibapensis*	G4	R	5
Idaho Sedge	*Carex idahoa*	G2, S2	GP2	2
Iodine Bush	*Allenrolfea occidentalis*	G4, S1	1	–
Jones' Primrose	*Primula incana*	G4, G5, S1	1	3
Lemhi Milkvetch	*Astragalus aquilonius*	G3, S3	GP3	2
Lost River Milkvetch	*Astragalus amnis-amissi*	G3, S3	GP3	3
Lost River Silene	*Silene scaposa var. lobata*	G4, S3	M	5
Marsh Felwort	*Lomatogonium rotatum*	G5, S1	1	3
Meadow Milkvetch	*Astragalus diversifolius*	G2, S2	GP2	3
Obscure Phacelia	*Phacelia inconspicua*	G2, S1	GP1	2
Pale Sedge	*Carex livida*	G5, S2	S	4
Parks Milkvetch	*Astragalus leptaleus*	G4, S3	M	–
Picabo Milkvetch	*Astragalus oniciformis*	G3, S3	GP3	3
Pink Agoseris	*Agoseris lackschewitzii*	G4, S2	S	4

Common Name[a]	Scientific Name	Idaho Conservation Data Center Rankings[b]	Idaho Native Plant Society Ranking[b]	BLM Type[b]
Plains Milkvetch	*Astragalus gilviflorus*	G5, S2	S	3
Purple Meadow Rue	*Thalictrum dasycarpum*	G5, S2	1	3
Red Glasswort	*Salicornia rubra*	G4, S2	S	4
Rolland Bulrush	*Trichophorum pumilum*	G3, S1	1	2
Rush Aster	*Aster junciformis = Symphyotrichum boreale*	G5, S2	S	4
Rydberg's Spring Beauty	*Claytonia multiscapa*	G5, T4, S1	1	3
Sepal-tooth Dodder	*Cuscuta denticulata*	G4, G5, S1	1	3
Simple Kobresia	*Kobresia simpliciuscula*	G5, S2	2	4
Small-flowered Ricegrass	*Piptatherum micranthum*	G5, S1	2	3
Spreading Gilia	*Ipomopsis polycladon*	G4, S2	2	3
St. Anthony Evening Primrose	*Oenothera psammophila*	G3, S3	GP3	2
Swamp Willow-weed	*Epilobium palustre*	G5	M	5
Sweetgrass	*Hierochloe odorata*	G5, S1	1	–
Two-grooved Milkvetch	*Astragalus bisulcatus var. bisulcatus*	G5, T5, S2	S	4
Ute Ladies'-tresses	*Spiranthes diluvialis*	G2, S1	2	1
Welsh's Buckwheat	*Eriogonum capistratum var. welshii*	G4, T2, S2	GP2	2
Western Sedge	*Carex occidentalis*	G4, SH	R	3
White Spruce	*Picea glauca*	G5, S1	2	4
Winged-seed Evening Primrose	*Camissonia pterosperma*	G4, S2	S	4

a. Common names for plants are highly variable among plant authorities and the public. The common names presented here are those recognized by the IDCDC as common.

b. Rankings are defined in **Appendix B**, Idaho BLM Special Status Species Ranking Protocols (2003)

Table 2-21. Distribution of special status plant species by habitat and location.

Species	Associated Habitat	Global Location[a,b] (not including ID)	Locations in Idaho[a]
BLM Type 1—ESA Listed, Proposed, and Candidate Species			
Ute Ladies'-tresses (*Spiranthes diluvialis*)	Subirrigated, alluvial soils along streams and rivers and their floodplains, including abandoned river channels, wet meadows, and open seepy areas	Distribution is very discontinuous within NE, WY, CO, UT, NV, ID, MT, and WA.	South Fork of the Snake River floodplain in Jefferson, Madison, and Bonneville Counties, the Henry's Fork River near St. Anthony in Fremont County, and Snake River, Fort Hall Indian Reservation
BLM Type 2—Rangewide/Globally Imperiled Species			
Lemhi Milkvetch (*Astragalus aquilonius*)	Calcareous soils	Endemic to east-central ID	Custer, Butte, and Lemhi Counties
Idaho Sedge (*Carex idahoa)*	Moist, alkaline meadows of mountain valleys	Western U.S., CA, MT, OR, and UT	Caribou, Clark and Lemhi Counties
Welsh's Buckwheat (*Eriogonum capistratum var. welshi*)	Dry windswept valley bottom alluvial fans and benches to foothill ridges and bluffs of the surrounding mountains	Endemic to east-central ID	Custer, Butte, and Lemhi Counties
Saint Anthony Evening-Primrose (*Oenothera psammophila*)	The trailing margins of migrating sand dunes over basalt	Endemic to eastern ID	St. Anthony Sand Dune complex in Fremont County
Obscure Phacelia (*Phacelia inconspicua*)	Fairly steep, north- to east-facing, lower- to mid-slopes lying below the rimrock of butte tops or foothill ridgetops	Humboldt Mountains in northwestern NV	Butte and Blaine counties and the upper Snake River Plain in and around the Craters of the Moon National Monument and Preserve
Alkali Primrose (*Primula alcalina*)	Wet, spring-fed, alkaline, intermontane valley meadow systems	Narrowly endemic to east-central ID and immediately adjacent southwestern MT	Custer, Butte, and Lemhi Counties
Rolland's Bulrush (*Trichophorum pumilum*)	Rich fens, wet calcareous soils	AK, CA, CO, ID, MT, WY; AB, BC, NT, QC, SK, YT (Canada)	Custer and Clark Counties
BLM Type 3—Regional/State Imperiled Species			
Lost River Milkvetch (*Astragalus amnis-amissi*)	Ledges, crevices, and other outcrops on steep limestone cliffs	Endemic to east-central ID	Lemhi range in Custer and Butte Counties

Species	Associated Habitat	Global Location[a,b] (not including ID)	Locations in Idaho[a]
Meadow Milkvetch (*Astragalus diversifolius*)	Moist soils in alkaline meadows	Widely separated populations in the southwestern Salt Lake Desert, UT, and Spring Valley area in NV. Historical record in the Green River Basin in western WY	Widely separated populations in Lemhi, Custer, and Bingham Counties
Tufted Milkvetch (*Astragalus gilviflorus*)	Open, sparsely vegetated, rocky, gentle to steeper limestone slopes with little soil development	Widespread on the high plains from southern AB and MB (Canada), south to OK, west to the Rocky Mountain foothills, and northeastern UT	Lemhi River and Birch Creek valleys in Lemhi and Clark Counties, and Henry's Lake in Fremont County
Picabo Milkvetch (*Astragalus oniciformis*)	Sandy sites, in basins, bowls, and flats within rolling basalt topography having deep, stable, well-drained, sandy, or sandy-loam soils	Endemic to south-central ID	Snake River Plain in Lincoln, Minidoka, and southern Blaine Counties
Blue Gramma (*Bouteloua gracilis)*	Flat, shallow, fine sandy clay-loam to loam soils.	AZ, CA, CO, CT, FL, IA, IL, KS, MA, ME, MI , MN, MO, MT, ND, NE, NM, NV, NY, OH, OK, SC, SD, TX, UT, WI, WY	Clark and Lemhi Counties
Western Sedge (*Carex occidentalis*)	Dry, open, or lightly wooded slopes	Southern Rocky Mountains from southeastern WY to NM, west to UT, NV, AZ, and southern CA, with disjunct populations in northwest WY and southwest MT	Bonneville County
Rydberg's Springbeauty (*Claytonia multiscapa)*	Interface of Artemisia cana and open sedge meadows	BC (Canada), AK, MT, WA, WY; Eurasia (Russia)	Fremont County
Sepal-tooth Dodder (*Cuscuta denticulata*)	Occurs on various desert shrubs	CA to NV, AZ, and WA; Mexico (Baja CA)	Hells Canyon in Idaho County and the Birch Creek Valley in Clark County
Chatterbox Orchid (*Epipactis gigantea*)	Moist areas along stream banks, lake margins, seeps and warm calcareous springs	From central Mexico northward to TX and throughout the western U.S. to southern BC (Canada)	Elmore, Camas, Gooding, Jerome, Twin Falls, Owyhee, Clark and Madison Counties

Species	Associated Habitat	Global Location[a,b] (not including ID)	Locations in Idaho[a]
Green Keeled Cotton-grass (*Eriophorum viridicarinatum)*	Bogs, peatlands, and wet meadows	From NL (Canada) to AK, south to NY, MI, CO, WY, WA, and MT	Bonner, Boundary, Fremont, Idaho, Teton and Valley Counties
Camas Goldenweed (*Pyrrocoma insecticruris = Haplopappus insecticruris)*	Gravelly, loamy, fine-textured soil with little to no slope	Endemic to south-central ID	Blaine, Camas, Elmore, Gooding, and Lincoln Counties
Spreading Gilia (*Ipomopsis polycladon*)	Dry, open areas in desert shrub communities	Mexico, northward to CA, west TX, NM, AZ, western CO, WY, most of UT, NV, and OR	Butte and Power Counties
Marsh Felwort (*Lomatogonium rotatum*)	Spring-fed, alkaline, sometimes hummocky, meadows, fens, and streamside areas in the montane zone	Western North America from AK south to AB (Canada) and in the Rocky Mountains from MT south to NM. In eastern North America from Hudson Bay (Canada) south to MA. Also in Greenland, Iceland, northern Europe and Siberia.	Custer and Lemhi Counties
Green Needlegrass (*Nassella viridula*)	Grasslands and sagebrush slopes	AZ, CA, CO, IA, IL, KS, MN, MT, ND, NE, NM, NY, SD, UT, WI, WY and AB, BC, MB, NT, SK (Canada)	Beaverhead Mountains in Clark County and near Soda Springs in Caribou County
Hall's orthotrichum moss (*Orthotrichum halli)*	Calcareous soils	Western North America and East Asia. In the Pacific Northwest it is known from CA, OR, WA, WY; BC (Canada)	Throughout ID
Challis Crazyweed (*Oxytropis besseyi* var. *salmonensis)*	Gravel benches	Endemic to central ID	Custer and Lemhi Counties
Small-flowered Ricegrass (*Piptatherum micranthum*)	Dry, open, often sandy soil or rocky ridge areas from the sagebrush foothills to open forests at middle elevations	AZ, CA, CO, MT, ND, NE, NM, NV, OK, SD, TX, UT, WY; AB, BC, MB, SK (Canada)	Clark County
Jones' Primrose (*Primula incana)*	In seral herb communities with alkaline clay soil in river flood plains and in open meadows	From UT and CO north to AK and east to QC (Canada)	Custer, Lemhi, and Teton Counties

Species	Associated Habitat	Global Location[a,b] (not including ID)	Locations in Idaho[a]
False Mountain Willow (*Salix pseudomonticola)*	Mesic to moist fens, forests and floodplains in mountains.	AK, MN, MT, SD, WA, WY; AB, BC, MB, NT, ON, QC, SK, YT (Canada)	Blaine, Clark, Custer, Fremont, and Lemhi Counties
Purple Meadow Rue (*Thalictrum dasycarpum)*	Meadowland and moist woods.	AK, AZ, AR, CO, IL, IN, IA, KS, KY, LA, MI, MN, MS, MO, MT, NE, NM, NY, ND, OH, OK, PA, SD, TN, TX, UT, WI, WY; AB, BC, MB, ON, QC, SK, YT (Canada)	Blaine, Boundary, Bonner, Cassia, Elmore, Fremont, and Kootenai Counties
BLM Type 4—Peripheral Species			
Pink Agoseris (*Agoseris lackschewitzii)*	Wet mountain meadows, middle to subalpine elevations	Endemic to east-central ID, southwest MT and the Wind River and Beartooth ranges of northwest WY	Clark, Fremont and Lemhi Counties
Rush Aster (*Aster junciformis = Symphyotrichum boreale*)	Aquatic riparian areas	AK, eastward to QC (Canada), and CO, WY, NE, SD, MN, and NJ	Henry's Lake and Driggs areas in eastern ID, near Thousands Springs in east-central ID, the McCall area in west-central ID, and the Panhandle region in north ID
Two-grooved Milkvetch (*Astragalus bisulcatus var. bisulcatus*)	Open grassland steppe, badlands, gullies, roadsides, and valley bottoms	Central AB to southwestern MB (Canada), south to KS and NM, west to north-central AZ, UT, and southwestern MT.	Beaverhead and Centennial Mountain ranges in Clark County, the Henry's Lake area in Fremont County, and the Lemhi River drainage in Lemhi County
Winged-seed Evening Primrose (*Camissonia pterosperma*)	Dry, open slopes, ridges, and washes in the sagebrush and juniper zones	Southeastern OR and NV to Inyo County, CA, northern AZ, and portions of UT	Disjunct populations in Lost River, Lemhi, and Beaverhead mountain ranges
Pale Sedge (*Carex livida*)	Peat bogs, swampy woods, low elevations	Canada; western North America from southern AK south to northwestern WA, OR, CA, MT, WY, CO, and UT	Boundary, Bonner, Custer, Fremont, Idaho, Lemhi, Kootenai, Teton and Valley Counties
Cushion Cactus (*Coryphantha vivipara*)	Dry valleys and plains	AB (Canada) south to AZ, east to MN, and TX, as far west as southeastern OR	Lemhi and Owyhee Counties

Species	Associated Habitat	Global Location[a,b] (not including ID)	Locations in Idaho[a]
Earth Lichen (*Hetrocatapyrenium congestum)*	Restricted to barren, slightly natric soil playettes within Wyoming sagebrush and shadscale steppe communities	Endemic to two counties in ID	Butte and Owyhee Counties
Simple Kobresia (*Kobresia simpliciuscula)*	Bogs, wet meadows, pond edges, moderate to high elevations	Greenland; AB, BC, MB, NL, NT, NU, ON, QC, YT (Canada); AK, CO, OR, UT, WY; Eurasia	Custer, Lemhi, and Teton Counties
White Spruce (*Picea glauca)*	Swamps and river banks to montane slopes	AK and across Canada, to MT, MN, WI, MI, NE, and in UT, WY, SD	Bannock, Boundary, and Fremont Counties
Red Glasswort (*Salicornia rubra*)	Moist, saline or alkaline soil of flats, shores, seepage areas, and ditches	Southern BC (Canada) and eastern WA to SK (Canada) and western MN, southward to NV, UT, NM, and KS	Bannock, Bear Lake, Bingham, Caribou, Franklin, and Oneida Counties
Hoary Willow (*Salix candida*)	Bogs, fens, marshes, pond edges, and seepage areas	From AK to NL (Canada), south to NJ, IA, ND and SD, WA, ID, MT, WY, and CO	Butte, Custer, Lemhi, Fremont, Teton, and Caribou Counties
Grayleaf Willow (*Salix glauca)*	Moist places or open slopes at moderate to high elevations	AK, CO, ID, MT, NM, OR, UT, WA, WY. AB, BC, LB, MB, NF, NS, NT, NU, ON, QC, SK, YT (Canada), Denmark France	Adams, Bear Lake, Blaine, Bonneville, Custer, Fremont, and Idaho Counties
Bulb-bearing Waterhemlock (*Cicuta bulbifera)*	Marshes, bogs, wet meadows, shallow standing water	Most of Canada south to WA, WY, NE, and the mid-Atlantic states. It is rare along the fringes of its range	Bingham, Bonner, Boundary, Fremont, Idaho, and Teton Counties
BLM Type 5—Watch Species			
Ibapah Springparsley (*Cymopterus ibapensis*)	High dry slopes	Ten counties in UT, northern NV, OR	Lemhi, Custer, and Butte Counties
Swamp Willowherb (*Epilobium palustre*)	Riparian–wetland	Canada; AK, CA, CO, CT, ID, KS, MA, ME, MI, MN, MT, NH, NM, NV, NY, OR, PA, RI, SD, UT, VT, WA, WI, WY	Clark, Fremont, Teton, Custer, Valley, Idaho, Boundary, Bonner, and Kootenai Counties
Hall's Rush (*Juncus hallii*)	Dry, wet, and boggy meadows, margins of ponds and lakes, and along streams	CO, MT, UT, WA, WY	Lemhi and Owyhee Counties

Species	Associated Habitat	Global Location[a,b] (not including ID)	Locations in Idaho[a]
Lost River Silene (*Silene scaposa var. lobata*)	Subalpine grassy, gravelly, or rocky slopes, ponderosa pine forests, juniper scrub, sagebrush; 900-3000	CO, NV, OR	Blaine, Butte, Clark and Twin Falls Counties
Other State of Idaho Sensitive Species with No Associated BLM ranking			
Iodine Bush (*Allenrolfea occidentalis*)	Saline or alkaline soil	AZ, CA, NM, NV, OR, TX, UT; Mexico	Bingham, Cassia, and Oneida Counties
Parks Milkvetch (*Astragalus leptaleus)*	Sedge meadows, swales and turfy hummocks along streams	Western MT, through the Rocky Mountains to CO	Sixteen occurrences in Custer and Lemhi Counties
Sweetgrass (*Hierochloe odorata*)	Inhabits moist ground on shores (fresh or brackish), meadows, low prairies, at the edges of woods, bogs and marshes	Northwestern Europe and northeastern North America	Bonneville County

a. Standard 2-letter abbreviations used for U.S. States and Canada Provinces. U.S. unless otherwise stated.

b. Global Distribution data collected from multiple sources including: USDA Plants Database (http://plants.usda.gov/index.html) and Flora of North America (http://www.efloras.org/index.aspx) (Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 12+ vols. New York and Oxford).

2.10.3. Trends

Trends for special status plant species are not well known. Additional inventories are needed to acquire improved baseline data of known plant occurrences. Once located, monitoring should enable trends to be established.

In May 1996, the Central Utah Water Conservancy District petitioned the USFWS to delist Ute ladies'-tresses on the grounds that it was sufficiently widespread and secure enough to no longer warrant protection under the ESA (INPS 2005).

On 12 October 2004, USFWS announced a 90-day finding that the petition presented sufficient information to initiate a status review to determine whether delisting was warranted (69 *Federal Register* [FR] 196, 2004). A 2005 status review found that in the years following listing, additional field surveys and monitoring greatly increased the number of known populations, total population size, and the global range of this species. Today, Ute ladies'-tresses is known from 52 extant populations, approximately 83,300 individuals, and is found in 8 states (including Idaho, Montana, Nebraska, Washington, and Wyoming). New monitoring and demographic research have documented that populations are more stable than originally suspected (especially if subterranean seedling and dormant individuals are counted) and more tolerant of human-induced disturbances. Studies have found that winter grazing and early season mowing can reduce competing vegetation cover and favor orchid survival and reproduction, while grazing or haying after flower production can be detrimental. Many threats to Ute ladies'-tresses remain high, especially flooding and de-watering associated with wetland development, competition from non-native

plants, loss or degradation of habitat associated with urban/residential expansion and development of road and water infrastructure, inappropriately timed agricultural practices, and vegetation succession. This species was originally thought to be limited to relictual, undisturbed riparian habitats, but is now known to occur in agricultural lands and managed riparian systems where frequent human-influence disturbance events simulate natural early to mid-seral conditions. Today, about 35% of all known populations are in protected areas or afforded some form of special management attention (Fertig, Black, and Wolken 2005).

In the FOA, Ute ladies'-tresses monitoring has been performed since 1997 resulting in comprehensive trend information for this species and for natural habitat conditions along the South Fork of the Snake River. In 2007, the primary threats to Ute ladies'-tresses along the South Fork Snake River were invasion and colonization by invasive species/noxious weeds, shrub and tree encroachment, wildlife activity (native ungulate bedding, trails, browsing and beaver impacts), competition by forbs, human-caused ground disturbance (roads, houses, excavation, filling), and recreation (human trails, campsite impacts) (IDCDC 2007a).

The trends for Ute ladies'-tresses are evaluated by direct and indirect threats. The direct threats and changes to habitat include the following (IDCDC 2007a):

- hydrologic and fluvial geomorphic change—bank erosion, deposition, loss of soil moisture at capillary fringe,
- invasive species/noxious weeds—invasion and colonization of noxious and invasive weedy species (some weeds include spotted knapweed, diffuse knapweed, leafy spurge, musk thistle, Canada thistle, houndstounge, and perennial sowthistle),
- livestock grazing impact—forage utilization, trampling, trails, and bedding,
- OHV use impacts—tracking and trailing through population areas,
- recreation—human trails, campsite impacts,
- other human-caused ground disturbance—roads, houses, excavation, filling, heavy equipment use, fire fighting, etc.,
- fire/wildfire,
- confirmed direct loss of Ute ladies'-tresses individuals—herbicide spraying, human harvest, disease, or other mortality causes,
- wildlife activity—ungulate bedding, trampling, trails, grazing, and shrub browsing, and beaver wood cutting and piling, and
- conifer encroachment.

The indirect threats and changes to habitat include the following:

- vegetation succession—competition by tall or invasive forbs, competition by shrubs and trees,
- alteration of floodplain—levees, rip-rapping, culverts, bridges, causeways, diversions, or other development that alters river hydrology or fluvial geomorphology, and

- management activities—exclosures, fences, or other measures including biocontrol insects on noxious weeds.

Methodology used for Ute ladies'-tresses monitoring does not lend itself to statistical analyses, which would be useful for assessing trends (e.g., greater power in detecting increased noxious weed cover). However, the Upper Snake FO has used the current transect and landscape monitoring methodology for the last 5 years, and the data has shown that most threats have stabilized. Some threats have decreased over time (e.g., as campground activities encroachingt on populations), and others have increased (e.g., noxious weeds).

2.10.4. Forecast

Recreation has the highest potential for causing downward trends in special status plant species habitats (Public Employees for Environmental Responsibility 2007). Physical damage associated the increasing use of OHVs and competition from noxious weeds/invasive species are the greatest threats to special status plant species.

The Idaho Standards for Rangeland Health (BLM 1997a) and PFC for riparian–wetland health (discussed in **Section 2.9**, Vegetation—Riparian Habitats and Wetlands and in BLM guidance [e.g., BLM 1998a,b,c]) are currently used to evaluate the condition of potential and occupied habitat of special status plant species. Any information about special status plants is taken into consideration during the evaluation and if livestock are found to adversely affect a special status plant or its habitat, modifications to a grazing permit can be made.

Other activities such as mining and actions associated with the issuance of ROWs also have the potential to negatively impact special status plant species habitat. Impacts that that are identified are evaluated and mitigated on a case-by-case basis.

2.10.5. Key Features

There are a number of locations within the FOA that are considered exceptionally suitable for special status plants and rare endemic plant species. These include the Upper Snake FOA has been broken into the following eight distinctive habitat areas: the Big Lost River Valley, Little Lost River Valley, Birch Creek Valley, Medicine Lodge, Island Park area, Sand Creek area, South Fork/Henry's Fork Snake River, and Big Desert.

The Little Lost River Valley contains unique habitat for rare and endemics plants, many of which are listed with the BLM and the State of Idaho as special status and in need of conservation. There are 14 known species that occur in the Little Lost River Valley. Nine occur on public lands managed by the Upper Snake FO and five others have the potential to occur there.

The Birch Creek Valley area is home to 14 known rare endemic species. Five occur on public lands managed by the Upper Snake FO and nine others have the potential to occur.

The Island Park area also possesses a large number of special status plants. There are 17 species that occur in the Island Park area: 8 occur on public lands managed by the Upper Snake FO, and 9 others have the potential to occur.

The Big Lost River Valley, Medicine Lodge, Sand Creek, South Fork/Henry's Fork Snake River, and Big Desert areas contain pockets of unique habitat that supports special status plant species. As inventories are completed, the management for these areas will be evaluated and modified if needed to protect these special status species.

Designated and proposed special management areas for plants and their habitats within RNAs and ACECs are discussed in **Section 2.27**, Special and Administrative Designations.

2.11. Special Status Species—Wildlife

Special status wildlife species include listed (T&E), candidate, proposed, state-listed, and BLM sensitive species, which are designated by federal and state agencies (BLM 2008c). There are currently 56 special status wildlife species that are known to occupy or have potential habitat within the Upper Snake FO. Of these species, 1 is federally listed as candidate, 1 is listed as threatened, 31 species are BLM sensitive (Types 2–4), and 24 are on the "watch list" (BLM Type 5) as possible sensitive species.

Grizzly bears were listed as a threatened species under the ESA in September 2009 (USFWS 2009). The yellow-billed cuckoo is a candidate species for federal listing as threatened or endangered.

2.11.1. Indicators

Planning and management of special status species within the Upper Snake FOA is guided by maintaining and/or improving habitat. BLM manages habitat for such species in cooperation with the USFWS, IDFG, and others with the goal to achieve viable, self-sustaining populations that will no longer require special protection and management. Habitat condition is determined from baseline data on wildlife populations involved and vegetation inventories and measurements that reflect habitat quality. For example, indicators such as vegetative cover, structure, composition, and diversity, are used to measure habitat quality for greater sage-grouse to comply with goals of sensitive species habitats as identified in BLM guidance (BLM Manual 6840, BLM 2008c) and directives such as the Idaho Standards for Rangeland Health (BLM 1997a). Standard 8 of the Idaho Standards for Rangelend Health requires that habitats should be maintained as suitable for populations of T&E, sensitive, and other special status species. The Upper Snake FO has limited information available for special status species. Annual funding typically determines the type and level of monitoring conducted, which may include greater sage-grouse lek monitoring each spring, bald eagle (*Haliaeetus leucocephalus*) nest surveys and winter counts, habitat stronghold monitoring of yellow-billed cuckoo, and Townsend's big-eared bat (*Corynorhinus townsendii*) hibernacula surveys.

The IDFG developed the Idaho Comprehensive Wildlife Conservation Strategy (CWCS, IDFG 2005a). The strategy identified 229 species of greatest conservation need (SGCN) in Idaho, 55 of which occur in the PA, and established an ecological, habitat-based framework to aid in the conservation and management of these species. The strategy provided action recommendations to sustain and improve the population status and habitat conditions of SGCN, described a long-term monitoring approach, and complemented other conservation strategies, funding sources, planning initiatives, and legally mandated activities. The SGCN includes all federally listed and candidate species, as well as the majority of the BLM sensitive and watch species.

2.11.2. Current Condition

Some of the most ecologically diverse wildlife habitat in Idaho is present within the Upper Snake PA, which crosses four major ecological regions: the Snake River Plain, Northern Basin and Range, Idaho Batholith, and Middle Rockies as shown in **Figure A-2, Appendix A–Maps,** and as described in **Section 2.2.3**, Level III Ecoregions. A variety of wildlife habitats corresponding generally to vegetation types occurs throughout the PA. The wildlife species found in these habitats vary in abundance and diversity depending upon the type and condition of the vegetation community.

Table 2-22 presents a list of the special status species that have been identified as occurring or potentially occurring within the Upper Snake FO PA. The table also presents IDCDC rankings, BLM types (**Appendix B**), and current status with the IDFG. **Table 2-23** presents a list of habitat and distribution information for the special status species in the PA. **Section 2.8**, Vegetation—Upland Vegetation and Habitats, describes these cover types in more detail.

Table 2-22. Special status wildlife species occurring, or potentially occurring, within the PA.

Species	Scientific Name	Idaho Conservation Data Center Ranking[a]	Idaho Fish and Game Status	BLM Type[a]
Birds				
Yellow–billed Cuckoo	*Coccyzus americanus*	G5, S2B	Protected Nongame Species	1
Bald Eagle	*Haliaeetus leucocephalus*	G4, S3	Protected Nongame	2
Greater Sage-grouse	*Centrocerus urophasianus*	G4, S2	Game Species	2
Black Tern	*Chlidonias niger*	G4, S1	Protected Nongame	3
Brewer's Sparrow	*Spizella breweri*	G5, S3	Protected Nongame	3
Calliope Hummingbird	*Stellula calliope*	G5, S5	Protected Nongame Species	3
Columbian Sharp-tailed Grouse	*Tympanuchus phasianellus columbianus*	G4, S1	Game Species	3
Ferruginous Hawk	*Buteo regalis*	G4, S3	Protected Nongame	3
Flammulated Owl	*Otus flammeolus*	G4, S1	Protected Nongame	3
Hammond's Flycatcher	*Empidonax hammondii*	G5, S5B	Protected Nongame Species	3
Lewis's Woodpecker	*Melanerpes lewis*	G4, S3	Protected Nongame	3
Loggerhead Shrike	*Lanius ludovicianus*	G4, S3	Protected Nongame Species	3
Northern Goshawk	*Accipter gentilis*	G5, S5	Protected Nongame Species	3
Olive–sided Flycatcher	*Contopus cooperi*	G4, S3B	Protected Nongame Species	3
Peregrine Falcon	*Falco peregrinus anatum*	G4, S2	Threatened	3
Prairie Falcon	*Falco mexicanus*	G5, S4	Protected Nongame	3
Sage Sparrow	*Amphispiza belli*	G5, S3	Protected Nongame	3
Trumpeter Swan	*Cygnus buccinator*	G4, S1	Game Species	3
Williamson's Sapsucker	*Sphyrapicus thyroideus*	G5, S4B	Protected Nongame Species	3
Willow Flycatcher	*Empidonax traillii*	G5, S5B	Protected Nongame Species	3

Species	Scientific Name	Idaho Conservation Data Center Ranking[a]	Idaho Fish and Game Status	BLM Type[a]
Virginia's Warbler	*Vermivora virginiae*	G5, S1B	Protected Nongame Species	4
White–faced Ibis	*Plegadis chihi*	G5, S2B	Protected Nongame Species	4
Barrow's Goldeneye	*Bucephala islandica*	G5, S4B	Game Bird	5
Black–backed Woodpecker	*Picoides arcticus*	G5, S3	Protected Nongame Species	5
Blue Grouse	*Dendragapus obscurus*	G5, S5	Game Bird	5
Boreal Owl	*Aegolius funereus*	G5, S2	Protected Nongame Species	5
Brewer's Blackbird	*Euphagus cyanocephalus*	G5, S5B	Protected Nongame Species	5
Burrowing Owl	*Athene cunicularia hypugaea*	G4, S2B	Protected Nongame Species	5
Cassin's Finch	*Carpodacus cassinii*	G5, S5	Protected Nongame Species	5
Cordilleran Flycatcher	*Empidonax occidentalis*	G5, S4B	Protected Nongame Species	5
Grasshopper Sparrow	*Ammodramus savannarum*	G5, S2B	Protected Nongame Species	5
Great Gray Owl	*Strix nebulosa*	G5, S3	Protected Nongame Species	5
Green–tailed Towhee	*Pipilo chlorurus*	G5, S5B	Protected Nongame Species	5
Long–billed Curlew	*Numenius americanus*	G5, S2B	Protected Nongame Species	5
Northern Pygmy–Owl	*Glaucidium gnoma*	G5, S3	Protected Nongame Species	5
Pinyon Jay	*Gymnorhinus cyanocephalus*	G5, S1	Protected Nongame Species	5
Red–naped Sapsucker	*Sphyrapicus nuchalis*	G5, S5B	Protected Nongame Species	5
Sage Thrasher	*Oreoscoptes montanus*	G5, S3B	Protected Nongame Species	5
Short–eared Owl	*Asio flammeus*	G5, S4	Protected Nongame Species	5
Swainson's Hawk	*Buteo swainsoni*	G5, S3B	Protected Nongame Species	5
Wilson's Phalarope	*Phalaropus tricolor*	G5, S3B	Protected Nongame Species	5

Species	Scientific Name	Idaho Conservation Data Center Ranking[a]	Idaho Fish and Game Status	BLM Type[a]
Mammals				
Canada Lynx	*Lynx canadensis*	G5, S1	Furbearing Animal; Threatened Species	1[b]
Grizzly Bear	*Ursus arctos horribilis*	G4, S1	Big Game Animal	1
Gray Wolf	*Canis lupis*	G4, S2	Big Game Animal	2
Pygmy Rabbit	*Brachylagus idahoensis*	G4, S2	Protected Nongame	2
Paiute Ground Squirrel	*Spermophilus mollis artemisae*	G5, S2	Protected Nongame	3
Townsend's Big-eared Bat	*Corynorhinus townsendii*	G4, S3	Protected Nongame	3
Wolverine	*Gulo gulo*	G4, S2	Protected Nongame Species	3
Long–eared Myotis	*Myotis evotis*	G5, S3	Protected Nongame Species	5
Long–legged Myotis	*Myotis volans*	G5, S3	Protected Nongame Species	5
Western Small–footed Myotis	*Myotis ciliolabrum*	G5, S4	Protected Nongame Species	5
Yuma Myotis	*Myotis yumanensis*	G5, S3	Protected Nongame Species	5
Reptiles				
Common Gartersnake	*Thamnophis sirtalis*	G5, S3	Protected Nongame Species	3
Nightsnake	*Hypsiglena torquata*	G5, S5	Protected Nongame Species	5
Terrestrial Invertebrates				
Blind Cave Leiodid Beetle	*Glacicavicola bathyscoides*	G3, S1	Not Classified	2
Idaho Pointheaded Grasshopper	*Acrolophitus pulchellus*	G1, S1	Not Classified	2
St. Anthony Sand Dunes Tiger Beetle	*Cicindela arenicola*	G2, S2	Not Classified	2

Notes: a. Rankings are defined in **Appendix B**, Idaho BLM Special Status Species Ranking Protocols (2003)

b. The USFWS has determined that the Upper Snake PA does not contain primary habitat, very little secondary habitat, and does not provide contiguous linkages to lynx habitat on USFS public lands.

Table 2-23. Habitat descriptions of special status wildlife species within the PA.

Species	Distribution, Requirements, and Habitat Issues
Birds	
Bald Eagle	The PA is an important bald eagle management area in Idaho, with the Lower Henry's Fork, South Fork Snake, Main Snake, and Teton Basin providing important nesting and wintering habitat. Bald eagles are typically found in the Riparian cover type.
Barrow's Goldeneye	Barrow's goldeneye typically nests in cavities of large trees near small, clear lakes, ponds, and reservoirs. They are often found feeding on the Snake River during winter months. They are most closely associated with the Open Water cover type. There is limited breeding habitat for Barrow's goldeneye within the PA.
Black–backed Woodpecker	Black-backed woodpeckers breed in mature or old-growth conifer forests, especially forests of spruce, larch, fir, pine, and hemlock, and they are strongly attracted to burned forests. There is limited available habitat for them within the PA but they may move in temporarily after a forest fire. Potential cover type is the Evergreen Forest.
Blue Grouse	Found along stream riparian and associated aspen and mixed conifer habitats in the northern portions of the PA. Blue grouse are most closely associated with the Mixed Evergreen Deciduous Forest and Riparian cover types.
Boreal Owl	Locally common within suitable habitat. Boreal owls may be found within the Mixed Evergreen Deciduous Forest and Evergreen Forest cover types within the PA.
Brewer's Blackbird	Brewer's blackbirds prefer Urban areas but are generalists and inhabit a wide variety of cover types including Riparian, Low Sagebrush, Mountain Sagebrush, Evergreen Woodland, Wyoming Basin Sagebrush, Mixed Evergreen Deciduous Forest, and Deciduous Semi-Desert Shrubland.
Brewer's Sparrow	Locally common breeder in sagebrush habitat in the PA. They are found in Low Sagebrush, Mountain Sagebrush, and Wyoming Basin Sagebrush cover types.
Burrowing Owl	An uncommon summer resident found mostly in low-elevation shrub-steppe habitats within the PA. Dependent on mammal burrows for nesting and roosting. Populations appear stable. Cover types include Wyoming Basin Sagebrush and Low Sagebrush.
Calliope Hummingbird	Breeding populations are secure in Idaho. Calliope hummingbirds are found in Mixed Evergreen Deciduous Forest, Evergreen Forest, and Riparian cover types.
Cassin's Finch	Breeding populations are secure in Idaho. Cassin's finch is found in the Evergreen Forest cover type.
Columbia Sharp-Tailed Grouse	Populations significantly reduced from historical distribution. Occupied habitat exists within the Upper Snake PA in the Sand Creek and Tex Creek/Willow Creek areas. Habitats characterized by dense herbaceous cover and mountain shrub patches. Good condition rangeland with adequate vertical cover is important for nest success and brood survival.

Species	Distribution, Requirements, and Habitat Issues
	Sharp-tailed grouse are found in the Mixed Evergreen Deciduous Forest, Riparian, and Evergreen Forest cover types.
Cordilleran Flycatcher	Breeding populations are secure in Idaho. Cordilleran flycatchers inhabit the Mixed Evergreen Deciduous Forest, Evergreen Forest, and Riparian cover types.
Ferruginous Hawk	Inhabits flat and rolling terrain in grassland or shrub-steppe throughout the PA. Typically nests on lone juniper trees or rock outcrops. Stronghold areas are found in the Little Lost, lower Birch Creek, and Crooked Creek areas. Populations may be declining. Ferruginous hawks inhabit the Wyoming Basin Sagebrush and Evergreen Woodland cover types.
Flammulated Owl	Flammulated owls are cavity nesters and wholly insectivorous. Populations are apparently secure but loss and fragmentation of mature forest habitat suggests populations are declining. Occupies Mixed Evergreen Deciduous Forest and Evergreen Forest cover types.
Grasshopper Sparrow	Grasshopper sparrows may be found in the southern portion of the field office in appropriate habitat. Populations in Idaho are considered vulnerable. Though much of North America populations are declining due to loss, degradation, and incompatible management of grassland habitat. Appropriate habitat consists of grassland with few shrubs. They may potentially be found in the Big Desert following wildland fires.
Great Gray Owl	Resident species occur in the far northern reaches of the PA with secure populations. Their habitat consists of the Evergreen Forest and Riparian cover types.
Greater Sage-grouse	Widespread throughout PA within intact low- and mid-elevation shrub-steppe. Travels over large areas to meet year-round habitat needs. Populations reduced from long-term averages. Most secure in Upper Snake sage-grouse area, less so in Big Desert sage-grouse area as a result of wildfire impacts. They are found in the Wyoming Basin Sagebrush and Riparian cover types.
Green–tailed Towhee	Populations are secure. Green-tailed towhees are generalists and may be found in a wide variety of habitats including the Wyoming Basin Sagebrush, Evergreen Woodland, Mountain Sagebrush, Riparian, Evergreen Forest, and Low Sagebrush cover types.
Hammond's Flycatcher	Populations are common in appropriate habitat and stable to increasing. Occupied habitats include the Mixed Evergreen Deciduous Forest and Evergreen Forest cover types.
Lewis's Woodpecker	This is a cavity nesting species and is common in appropriate habitat types. However, appropriate habitat types are limited in the FOA. This species is apparently secure in Idaho and may be found throughout the year in certain areas. They are found in the Mixed Evergreen Deciduous Forest, Evergreen Forest, Evergreen Woodland, and Riparian cover types.
Loggerhead Shrike	This species is still widespread and common in some areas but has been declining in North America since the 1960s and is considered vulnerable in Idaho. Loggerhead shrikes are found in the Wyoming Basin Sagebrush and Low Sagebrush cover types.

Species	Distribution, Requirements, and Habitat Issues
Long–billed Curlew	Long-billed curlews are found in the Teton Basin, Upper Henry's Fork, and Shotgun Valley areas. Preferred habitat consists of open, sparse grasslands, prairies, and meadows. There is limited preferred habitat available in the PA. Habitats used by curlews include the Wyoming Basin Sagebrush, Low Sagebrush, and Riparian cover types.
Northern Goshawk	Populations are secure but goshawk is an uncommon species. Suitable habitat exists on BLM public land, but in small, non-contiguous tracts. Known nesting territories within BLM lands in the Tex Creek, South Fork of Snake River, and Island Park areas. Large tree killing wildfires and forest health are issues of concern. The goshawk uses the Evergreen Forest cover type.
Northern Pygmy–Owl	Found in dense forests or open woodlands in foothills and mountains; frequents meadows while foraging. Usually found in vicinity of forest opening, rather than in unbroken, dense forest. Cover types used by pygmy owls include Mixed Evergreen Deciduous Forest, Evergreen Forest, and Riparian.
Olive–sided Flycatcher	Breed throughout Idaho in forests and woodlands. Uncommon within the PA but apparently secure in Idaho. The Evergreen Forest cover type may be used by Olive-sided flycatchers.
Peregrine Falcon	Nests on cliffs, forages over open habitats. Uncommon breeder within the PA. Cover types used by peregrine falcon would be Vegetated Rock for nesting and both Vegetated Rock and Open Water for foraging.
Pinyon Jay	Pinyon jay populations are globally secure but Idaho populations are considered imperiled. Pinyon jays are found infrequently in the PA, but they are known to move through the PA in spring and fall. Cover types used include Evergreen Woodland, Evergreen Forest, Wyoming Basin Sagebrush, Low Sagebrush, and Riparian.
Prairie Falcon	Populations are secure. Prairie falcons nest on cliffs, outcroppings, and ledges and forages over open habitats. Cover types used by prairie falcon would be Vegetated Rock for nesting and both Vegetated Rock and Wyoming Basin Sagebrush for foraging.
Red–naped Sapsucker	Populations are secure. Red-naped sapsuckers are found primarily in coniferous forests that include aspen and other hardwoods. Cavity nester. Cover types used by red-naped sapsuckers include Mixed Evergreen Deciduous Forest, Evergreen Forest, and Riparian.
Sage Sparrow	Populations are apparently secure in Idaho. Requires large tracts of sagebrush habitat. Sage sparrows may be found throughout the planning but not always found in appropriate habitat. Cover types used by sage sparrows are Wyoming Basin Sagebrush, Mountain Sagebrush, and Low Sagebrush.
Sage Thrasher	Populations in Idaho are secure. Sage thrashers are found in appropriate habitat throughout the PA. Sage thrashers are often found in the same habitat as sage sparrows but also use a wider variety of habitats than sage sparrows. Cover types used by sage thrashers includes Wyoming Basin Sagebrush, Mountain Sagebrush, Evergreen Woodland, Deciduous Semi-Desert Shrubland, and Low Sagebrush.

Species	Distribution, Requirements, and Habitat Issues
Short–eared Owl	Populations are secure in Idaho although vulnerable or imperiled in adjacent states. Common throughout the year in Upper Snake and Teton Basin. Cover types used include Wyoming Basin Sagebrush, Mountain Sagebrush, and Low Sagebrush.
Swainson's Hawk	Populations apparently secure in Idaho although pesticide use and habitat loss have previously resulted in declines. Typically nests in scattered trees found within Wyoming Basin Sagebrush, Mountain Sagebrush, Low Sagebrush, and Riparian cover types.
Trumpeter Swan	Limited nesting on wetlands in Island Park area; important winter habitat is on the South Fork of Snake River, Lower Henry's Fork, Teton Basin. Disturbance is a possible concern during late waterfowl seasons and extended fishing on the South Fork. Open Water is the cover type used by this species.
Virginia's Warbler	Species considered imperiled in Idaho. Two small breeding populations occur in the eastern Idaho on the northern most edge of their range. Cover types used include Deciduous Semi-Desert Shrub, Evergreen Woodland, Evergreen Forest, and Riparian.
White–faced Ibis	White-faced ibis are long-distance migrants that nest colonially in marshes and forages on flooded wetlands or crops such as alfalfa and barley. Although white-faced ibis may be found on the Lower Henry's Fork, South Fork Snake, and Teton Basin, there is little breeding or foraging habitat within the PA for them. Open Water is the cover type used by this species.
Williamson's Sapsucker	Populations are secure in Idaho; however, there is very limited potential habitat for Williamson's Sapsuckers in the PA and occurrences are rare. Mixed Evergreen Deciduous Forest and Evergreen Forest cover types are used.
Willow Flycatcher	This is a common breeder in appropriate habitat within the PA. Populations in Idaho are secure. Willow flycatchers are found in the Riparian cover type.
Wilson's Phalarope	Populations in Idaho are apparently secure. Nesting occurs in shallow wetlands. There is minimal habitat within the PA for Wilson's phalaropes. Cover type is Open Water.
Yellow-billed Cuckoo	ESA Candidate Species. Extremely rare in Idaho. Population stronghold appears to be along the South Fork of the Snake River between Heise, Idaho, and the Lorenzo bridge. Habitat is thick, mesic shrub and cottonwood overstory. Threats to the cuckoo's habitat include riparian loss and degradation, and they are typically found in the Riparian vegetation type.
Mammals	
Canada Lynx	Documented occurrences in Bonneville, Butte, Fremont, Clark, and Teton counties. The USFWS has determined that the PA does not contain primary habitat, very little secondary habitat, and does not provide contiguous linkages to lynx habitat on USFS public lands. Canada Lynx uses the Evergreen Forest cover type.

Species	Distribution, Requirements, and Habitat Issues
Gray Wolf	Increasingly widespread and increasing pack development. Cover types used include Mixed Evergreen Deciduous Forest and Evergreen Forest.
Grizzly Bear	Grizzly bears in the PA are part of the Greater Yellowstone grizzly bear population. As that population expanded, grizzly bear range also expanded and grizzly bears are now occuppying northeastern portions of the PA. Fragmentation from roads, logging, OHV use, and surrounding recreational development reduce quality habitat for the grizzly bear. Cover types used include areas isolated from human encroachment in Evergreen Forest, Vegetated Rock, and Riparian.
Long–eared Myotis	Populations globally secure but vulnerable in Idaho. Long-eared myotis have been found in Mixed Evergreen Deciduous Forest, Evergreen Forest, Vegetated Rock, and Riparian cover types within the PA.
Long–legged Myotis	Populations globally secure but vulnerable in Idaho. Few maternity roosts and winter hibernacula known in Idaho. Cover types include Evergreen Forest, Vegetated Rock, and Riparian.
Piute Ground Squirrel	Populations are thought to be declining; however, comprehensive surveys are lacking range wide. Associated with low elevation shrub-steppe throughout the PA. Inventory begun in southeast Idaho in 2007 would indicate species is common. Populations should be monitored for trends. The Wyoming Basin Sagebrush cover type is used.
Pygmy Rabbit	Considered rare throughout Idaho, but widely distributed throughout the Upper Snake PA. Populations tend to be patchy and localized. Habitats are generally in deeper loamy soils within fairly dense sagebrush of heights over 30 in. Habitat loss through wildfire and fragmentation are concerns. Wyoming Basin Sagebrush is the cover type used.
Townsend's Big-eared Bat	Largest known populations of wintering Townsend's big-eared bats in Idaho occur within the PA's lava-tube caves. Little information regarding summer habitat use. Populations appear stable. Wyoming Basin Sagebrush, Evergreen Forest, Mixed Evergreen Deciduous Forest, Vegetated Rock, and Riparian cover types are used.
Western Small–footed Myotis	Found in Wyoming Basin Sagebrush, Mixed Evergreen Deciduous Forest, Evergreen Forest, Vegetated Rock, and Riparian cover types throughout the PA. Appears to be a common summer resident but known to winter in only a few lava-tube caves within the PA.
Wolverine	Inhabits remote, mountainous areas unaffected by human disturbance (Copeland 1996)[a]. Have shown preference for subalpine habitats, and may associate with Douglas-fir and lodgepole pine habitats in winter (Copeland 1996). Primarily occurs on the NFSL within the PA. Numerous occurrences in northeastern portion of Region 6. Evergreen Forest is the cover type used.
Yuma Myotis	Globally secure but vulnerable in Idaho. Generalist habitat species but closely associated with water. Cover types include Mixed Evergreen Deciduous Forest, Evergreen Forest, Wyoming Basin Sagebrush, Mountain Sagebrush, Vegetated Rock, Low Sagebrush, and Riparian.

Species	Distribution, Requirements, and Habitat Issues
Reptiles	
Common Garter Snake	Populations secure in Idaho. Habitat generalist and occupies a variety of cover types including Mixed Evergreen Deciduous Forest, Evergreen Forest, Riparian, and Vegetated Rock.
Nightsnake	Night snakes are globally secure and demonstrably widespread, abundant, and secure in Idaho. They are known to use the Vegetated Rock cover type.
Terrestrial Invertebrates	
Blind Cave Leiodid Beetle	The beetle is an obligate inhabitant of several lava-tube caves within the Upper Snake PA. Primary threat to the species is alteration of cave habitat. Surveys have been conducted in only a few caves within the PA. Cover type is Vegetated Rock
Idaho Pointheaded Grasshopper	Idaho endemic grasshopper with undetermined status. Baker (2003)[b] surveyed previously collected sites in the Birch Creek Valley in 2002 and 2003 but no specimens were found. Baker stated that locating the species again should be attempted under improved habitat conditions. No management recommendations have been made. Wyoming Basin Sagebrush and Deciduous Semi-Desert Shrubland cover types are used.
St. Anthony Sand Dunes Tiger Beetle	An Idaho endemic tiger beetle associated with sand dunes with highest densities found in the St. Anthony Dunes within the Upper Snake PA. The larvae live in burrows located in flat, grassy areas where sand is at least a meter thick. Natural mortality is high, and larvae are particularly vulnerable to increased mortality form trampling or vehicles (IDFG 2005a)[c]. Studies conducted in 1988 and 2000 have shown that populations have remained stable. Cover type consists of Vegetated Rock.

a. Copeland, J., 1996. Biology of the wolverine in central Idaho. MS Thesis, University of Idaho, Moscow, Idaho. 138pp

b. Baker, C. W., 2003. Idaho Point-Headed Grasshopper Surveys, 2002–2003, for the Bureau of Land Management, Boise District Office. Unpublished report. Professor emeritus, Boise State University. Boise, Idaho

c. Idaho Department of Fish and Game, 2005a. Idaho Comprehensive Wildlife Conservation Strategy. Idaho Conservation Data Center, Idaho Department of Fish and Game, Boise, Idaho.http://fishandgame.idaho.gov/cms/tech/CDC/cwcs.cfm

The following are descriptions of sensitive (e.g., T&E, sage-grouse, bats) and priority (e.g., mule deer) species and their essential habitats found in the Upper Snake FOA. These species are considered significant for at least one of the follow factors: density, diversity, size, public interest, remnant charcter, or age.

Yellow-billed Cuckoos

Yellow-billed cuckoos have been documented on the South Fork of the Snake River and the Main Snake River above American Falls Reservoir. Yellow-billed cuckoos are migratory and are only present in Idaho during the breeding, nesting, and brood-rearing seasons (late spring to late summer). In Idaho, this species is considered a rare and local summer resident. The USFWS has stated that available information for Idaho is inadequate to judge population or distributional trends, and the breeding population is likely limited to a few breeding pairs (66 FR 143, 2001).

Grizzly Bear

In general, grizzly bears are larger and more heavily built than other bears. In the lower 48 states grizzly bears typically weigh between 250 and 600 pounds. They can be distinguished from black bears by longer, curved claws, humped shoulders, and a concave face. Coloration of grizzly bears varies widely from light brown to nearly black. They are long-lived generally living to be around 25 years (72 FR 60, 2007). Grizzly bears are opportunistic omnivores that adapt to a wide range of habitats (Yellowstone Grizzly Bear Delisting Advisory Team 2002). Throughout the year, grizzly bears occupy a mosaic of dissimilar habitat types. Seasonal use of these types depends on availability of preferred foods that are affected by weather, elevation, topography, precipitation, and temperature (Yellowstone Grizzly Bear Delisting Advisory Team 2002). Avalanche chutes, riparian zones, wet meadows, alpine meadows, and cirque basins are common foraging areas. Forests provide hiding and thermal cover but their use by bears seems to vary considerably between ecosystems (USDA 2006).

Suitable habitat is defined as (1) having habitat quality and quantity to support grizzly bear reproduction and survival; (2) contiguous with the current distribution of Yellowstone grizzly bears such that natural re-colonization is possible; and (3) having low mortality risk as indicated through reasonable and manageable levels of grizzly bear mortality (72 FR 60, 2007). BLM manages 5,580 acres within the area designated as suitable habitat. BLM-administered lands within this area are small, scattered and interspersed with private and state lands. This land is in 44 different parcels with the majority less than 100 acres in size and only 5 parcels are larger than 300 acres. Secure habitat consists of areas larger than 10 acres in size and more than 1,650 ft from a motorized access route or reoccurring helicopter flight line (72 FR 60, 2007). Currently, BLM manages approximately 600 acres that have been identified as secure grizzly bear habitat. Approximately 2,000 acres within suitable habitat were designated as the Henry's Lake ACEC in 1997. The intent of the ACEC was to recognize and conserve rare wetland vegetation communities, special status species and their habitats, including grizzly bears, and recreational values while maintaining multiple use activities on lands administered by the BLM.

On July 28, 1975, the grizzly bear (*Ursus arctos horribilis*) was designated as threatened in the conterminous (lower 48) United States (40 FR 145, 1975). Currently in the lower 48 states there are seven ecosystems recognized as grizzly bear primary conservation areas (PCAs). Five of these ecosystems are known to currently support grizzly bears: Yellowstone (northwest Wyoming, eastern Idaho, and southwest Montana), Northern Continental Divide (north–central Montana), Selkirk (northern Idaho, northeast Washington, and southeast British Columbia), Cabinet–Yaak (northwest Montana, northern Idaho), and Cascades (north–central Washington). The two remaining ecosystems, Bitterroot (east–central Idaho, western Montana) and San Juan Mountains (Colorado), currently do not contain grizzly bears. Grizzly bear in the PA are a part of the Yellowstone ecosystem.

On March 22, 2007, the USFWS established a distinct population segment of the grizzly bear for the Greater Yellowstone and surrounding areas and removed that population from the list of T&E wildlife (72 FR 60, 2007). Subsequently, on September 21, 2009, the delisting of the grizzly bear was vacated and they were returned the list of threatened species under the ESA (USFWS 2009).

The Interagency Grizzly Bear Study Team (IGBST) is an interdisciplinary group of scientists and biologists responsible for long-term monitoring and research efforts on grizzly bears in the Greater Yellowstone Ecosystem. The team is composed of representatives from the USGS, NPS, USFWS, USFS, Montana State University, and the states of Idaho, Montana, and Wyoming. This interagency approach

ensures consistency in data collection and allows for combining limited resources to address information needs throughout the ecosystem. The IGBST monitors grizzly bear populations for population trends and distribution; survival and birth rates; gene flow among populations; habitats; foods; and livestock and human impacts (72 FR 60, 2007). In October 2009, the IGBST estimated the current Yellowstone ecosystem grizzly population distinct population segment at 579 bears. The team determined that all recovery targets for grizzly bears were/are still being met and they have requested the judge to alter the original decision. The grizzly bear's general distribution, PCA, and its suitable habitat within the PA are shown on **Figure A-7**, in **Appendix A–Maps**.

Greater Sage-grouse

Sage-grouse have been the most important upland game species on BLM-administered public lands in southeastern Idaho and have long received considerable attention. The bird has been a priority species for habitat management by BLM for some time. Sage-grouse experienced declining population trends throughout the 1980s, and with changes that have taken place in the sagebrush ecosystem, sage-grouse have become an important management indicator species. While sage-grouse are found throughout the entire PA, based on long-term averages, they are continuing to show declining population trends in Idaho (Connelly et al. 2004). Populations in the Birch Creek drainage, for instance, have shown population declines as much as 80%.

The public lands within the Upper Snake PA are crucial to the success of sage-grouse as they provide breeding and brood-rearing habitat, and winter ranges. Within the northern half of the Upper Snake PA, approximately 50% of sage-grouse habitat is associated with public lands, while in the Big Desert area, primarily the western section of the PA, 75% of the sage-grouse habitat is associated with public lands. Sage-grouse habitat extends through most of the PA, with population strongholds located where large intact sagebrush areas (i.e., key habitat) remain.

Sage-grouse within the Upper Snake PA have been researched fairly extensively, and information on distribution and habitat use has been collected on populations in the Big Desert, Little Lost, and Birch Creek areas; Medicine Lodge watershed; Table Butte area; and Sand Creek Desert. Populations are considered to be mostly migratory. Movements between seasonal ranges have been known to exceed 47 mi (Connelly et al. 2000).

Habitat conditions vary considerably throughout the PA. A general habitat status map for sage-grouse is shown in **Figure A-8, Appendix A–Maps**. At the landscape scale, sage-grouse habitats in the Big Desert have been negatively affected more than any other in the PA. Approximately 70% of the Big Desert has been burned by wildfire since 1996. The impacted area has lost its large contiguous areas of sagebrush, leaving only patches of shrub, which has increased fragmentation and encouraged cheatgrass invasion. In the northern half of the Upper Snake PA, populations have also undergone declines, but habitat has not undergone landscape changes that have reduced large acreages of shrub cover as has happened in the Big Desert area. In general, threats to sage-grouse habitat include changes in land use, wildfire, fragmentation, livestock grazing, noxious weeds, and perennial grass and forb restoration (Idaho Sage-grouse Advisory Committee [ISAC] 2006).

The BLM has used several methods to evaluate and classify rangelands. In 1980, the Big Desert EIS determined range condition and ecological status by measuring the departure of the existing plant composition and production from the potential natural community (climax). With that method,

approximately 18% of the Big Desert area was considered in good condition, 48% in fair condition, and 7% in poor condition. The other 27% had been seeded (non-native perennial), burned (wildfire or prescribed), or otherwise disturbed during the analysis. Since the mid-1990s, much of the Big Desert area has experienced recurring wildfire, which continues to threaten vegetative diversity and natural succession over much of the area today.

In the late 1990s, BLM started to look at other measures of rangeland health, which included ecological considerations such as soil nutrient recycling; plant community structure, composition and productivity; and wildlife habitat. BLM also developed standardized methods for evaluating vegetative characteristics for sage-grouse habitats, which followed Connelly and others' (2000) "Guidelines to Manage Sage-grouse Populations and Their Habitats." Habitat quality indicators were found to include predominate sagebrush species, average sagebrush height, sagebrush canopy, sagebrush age, predominate grass species, average grass height, grass canopy, forb canopy, patch size, and vegetative mosaic on the landscape. The ability of big sagebrush sites to produce adequate herbaceous cover, stubble heights, and forb diversity, particularly during the May and early June nesting period, was found to be key to maintaining suitable sage-grouse breeding habitat. Other than loss of sagebrush cover, other common factors that reduce habitat quality for sage-grouse in the Upper Snake PA are lower grass and forb heights; reduced forb abundance and diversity; and reduced composition of tall bunchgrasses relative to site potential. Additionally, many areas have low potential as late brood-rearing habitat, as upland area forbs dry out quickly (such as in the Big Desert) and riparian–wetland areas are not present or reduced. As a consequence, long distance movement to suitable late brood-rearing habitats increases sage-grouse brood vulnerabilities.

It would not appear that sage-grouse winter habitat is a limiting factor in areas of the Lost River Ranges where habitat is less restricted and birds use intact areas with a diverse structure of brush, including windswept areas of low sagebrush that remain snow free. Other areas such as the Big Desert that have been influenced by recurring wildfires are more vulnerable during winter if sufficient areas of exposed sagebrush are not available for sage-grouse to use. Sage-grouse using areas in Fremont and Clark counties in the eastern portion of the PA are also more vulnerable as winter areas have been reduced from losses to agricultural lands, and thus, migration routes have been impacted.

While population numbers overall in the PA have shown increases within the past 5 years, it is evident that sage-grouse will continue to be a focal point for BLM management for decades to come.

Bats

Bats comprise a diverse group of species within Idaho and are resident or seasonal to all vegetative cover types within the PA. The ecological roles bats fulfill are complex and varied, such as controlling forest and agricultural pests and maintaining the balance of night-flying insect populations. Forty-six bat species are found in the U.S., and 14 species are known to occur in Idaho (Gillies 2004). As a group, bats are the most imperiled of North American species with six species listed as endangered and almost half the taxa are identified as species of concern with declining numbers. Within the PA, the Townsend's big-eared bat is of particular management concern. The largest known populations for Townsend's big-eared bats in Idaho occur with lava flows in the southeastern part of the state (Genter 1989). In the PA, distribution is significantly correlated with the availability of lava tube caves for roosting habitat. Since 1998, approximately 180 caves have been located, inventoried, and mapped in the Sand Creek Desert and 52 caves in the Big Desert. At least 13 caves have been identified as significant hibernacula for *C.*

townsendii. According to Pierson and others (1999), maintaining suitable habitat is correlated with available roosting and foraging habitat and their proximity to each other. In the Upper Snake FOA, this means protecting hibernacula from disturbance during the hibernacula period from activities such as recreational caving, and, for foraging areas, the protection and maintenance of healthy shrub-steppe.

Raptors

Raptors, (predatory birds such as hawks, eagles, owls, and falcons) are present in the PA throughout the year. Common breeding species include golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), kestrel (*Falco sparverius*), Swainson's hawk (*Buteo swainsonii*), great horned owl (*Bubo virginianus*), short-eared owl (*Asio flanumeus*), and marsh hawk (*Circus syaneus*). Lower elevation shrub-steppe habitat provides winter refuge to many rough-legged hawks (*Buteo lagopus*). All raptor species are of special concern for their aesthetic, educational, and scientific values. Ecologically, they are important for controlling small mammal species such as rabbits, hares, and rodents. All raptors are protected under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 7 § 701 et seq.). Raptors of particular interest include the ferruginous hawk (*Buteo regalis*), a BLM sensitive species, and the bald eagle (*Haliaeetus leucocephelus*), a threatened species de-listed by the USFWS on June 28, 2007.

Ferruginous hawks prefer broad, flat valleys dominated by sagebrush/grass habitat types and use a variety of substrates for nesting including rock outcrops, trees, human-made structures such as utility poles, and sometimes bare ground. Most of the breeding ferruginous hawks that occur in east–central Idaho, nest on public lands administered by the BLM (Craig and Craig 1999). Ferruginous hawks have become of interest to land managers because of known or suspected declines in nesting populations throughout their range (Olendorff 1993). While considerable potential habitat exists within the PA, nesting densities are concentrated in the Birch and Crooked Creek areas, with most birds occupying the Little Lost Valley. Preferred nesting sites are lone juniper trees growing at the ecotone between sagebrush and juniper habitats. Oar (2007) conducted ferruginous hawk nest surveys on 15 historic territories within the Little Lost Valley. Of six occupied nests, only two nests fledged young. Bechard, Hague-Bechard, and Porter (1986) indicated that 75% of the ferruginous hawk nests they located were "vulnerable or highly vulnerable to future loss of habitat or human disturbance."

The Snake River provides very important nesting and wintering habitat for the restoration and maintenance of the Greater Yellowstone Ecosystem bald eagle population as well as the Idaho bald eagle population. In 1991, bald eagles were listed as endangered under the ESA. Delisting goals were subsequently met and the bald eagle is no longer under federal protection under the ESA. In 1991, there were eight active bald eagle nests on the South Fork below Palisades Dam and three on the main stem and Henry's Fork. Currently there are 19 active nests (that comprise 13% of the active nests in Idaho) on the South Fork between Palisades Dam and the Henry's Fork confluence, 6 on the Henry's Fork River below St. Anthony, and 3 on the main stem of the Snake River. The majority of nests are located in large cottonwood trees along sections of the river while a few are found in large, above stand Douglas-fir trees. The Snake River corridor continues to be an important bald eagle management area in Idaho as 87% of nests produced young in 2006 compared to a 50% success rate throughout the remainder of Idaho. This is similar to the nest success of 85% found throughout the Wyoming portion of the Greater Yellowstone Ecosystem. In the southern part of the PA, a smaller, but growing number of eagles utilize the forested habitat of the Snake River between Idaho Falls and American Falls Reservoir, with 5 active bald eagle nests currently located on or near BLM-administered lands.

Pygmy Rabbit

The pygmy rabbit in Idaho is classified by BLM as a sensitive species. The USFWS issued a positive 90-day finding in January 2008 and will start a status review process (typically 12 months) to determine if listing is warranted under the ESA.

The pygmy rabbit is the smallest North American rabbit. Adult weights range from 0.54–1.2 lb and they are between 9.1–12.1 in. long. Pygmy rabbits are typically found in areas of tall, dense sagebrush cover where soils are sufficiently deep and loose to allow burrowing. The Upper Snake FO has conducted several studies within the PA to map current distribution and describe habitat requirements of the pygmy rabbit (Roberts 2003, 2004; BLM 2004b). Surveys were general in nature, involving visual searches of rabbit sign (using habitat attributes associated with presence of pygmy rabbits, or their burrows), and structured to focus on higher priority areas, mainly within the northern half of the PA. Though not common, pygmy rabbits were found in a variety of habitats and were distributed across the northern portion of the PA. They seem to be more prevalent in large intact native habitats with a presence of mature big sagebrush. Rabbits were mostly associated with "mounds" or deeper soils along drainages or alluvial fans, but not always. Rabbits exhibit a patchy distribution across the PA (Roberts 2003, 2004). Pygmy rabbits do not seem to be associated with isolated sagebrush areas, near fragmented areas associated with development and agriculture, or in areas subjected to increased fire frequency.

Gray Wolf

The gray wolf (*Canis lupus*) was listed as endangered on March 11, 1967. In response to the listing, a recovery plan was developed by the USFWS that divided portions of the wolf's range into recovery areas. The USFWS determined that ten breeding pairs of wolves inhabiting a recovery area for three consecutive years constituted a recovered population (USFWS 1987). In 1994, wolves in Idaho south of I-90 were listed under Section 10(j) of the ESA (50 FR 17, 1984) as a "non-essential, experimental population," meaning this particular population was not considered critical to the continued existence of the species. With this designation came greater management flexibility such that managers could pursue a reintroduction program, releasing 15 wolves in 1995 and 20 in 1996 into central Idaho, after natural recovery failed to occur within 5 years (IDFG 2008a).

Wolf reintroduction has been incredibly successful. The Northern Rocky Mountain population was removed from the list of T&E species on May 4, 2009 (50 FR 17). The minimum year-end population estimates for 2008 within Idaho was 846 wolves, 88 packs, with 39 documented breeding pairs. IDFG currently has management responsibility for the wolf throughout Idaho where they are managed as a big game animal consistent with the Idaho Wolf Population Management Plan 2008–2012 (IDFG 2008b).

In 2007 there were five known or suspected wolf packs within the boundaries of the Upper Snake PA (Nadeau et al. 2008a), in the northern portion of the area and near Falls Creek. The presence of wolves continues to be controversial. Livestock producers and other landowners may be negatively impacted by wolf recovery (i.e., economically or through the potential reduction of game species) and are typically opposed to wolf recovery (Wilmot and Clark 2005). However, livestock producers and other landowners provide many benefits to the long-term conservation of gray wolves, including maintenance of open space and habitats that support a wide variety of wildlife, including deer and elk. People that are favorable toward wolf recovery have concerns for extinction and restoration of natural ecosystems (Fritts et al. 2003). Wolves are also an important part of the Native American heritage.

Migratory Birds

Migratory birds include many species of waterfowl, shorebirds, songbirds, and raptors and make up more than 250 species within the PA. Many of these species are neotropical migratory birds that breed mostly in temperate zones and migrate to spend winters primarily south of the U.S. border. Many migratory birds are ecologically important in controlling insects, spreading seeds or pollinating plants, and controlling rodent populations. The management concern is that some of these species are declining while others are doing relatively well.

The extensive sagebrush habitat within the PA provides breeding habitat for sagebrush obligate species such as sage thrasher (*Oreoscoptes montanus*) and sage sparrow (*Amphispiza belli*). Other migratory birds breed and nest in sagebrush habitat including Brewer's and vesper sparrows (*Spizella breweri, Pooecetes gramineus*), Brewer's blackbird (*Euphagus cyanocephalus*), green-tailed towhees (*Pipilo chlorurus*), western meadowlark (*Sturnella neglecta*), gray flycatcher (*Empidonax wrightii*), and northern harrier (*Circus cyaneus*).

Riparian–wetland habitats are very important to neotropical migratory land birds. Riparian forests of the Henry's Fork and the South Fork of the Snake River are centers for the highest diversity and abundance of birds within the PA. Combined with riparian habitats of many small streams (shrub riparian), these areas provide nesting and stopover habitat as well as migration corridors for species that include raptors, warblers, sparrows, swallows, and shorebirds. Other breeding and nesting habitat for migratory birds within the PA include lava tubes, rocky outcrops, and grassland meadows. Population status and trend for most migratory species within the planning office are generally unknown.

Terrestrial Invertebrates

A complete census of invertebrate species within the PA does not exist. Often overlooked because of their small size, invertebrates are important links in terrestrial food webs, and can be extremely sensitive indicators of environmental change. Within the PA, three terrestrial invertebrates (the blind cave Leiodid beetle, the Idaho pointheaded grasshopper, and the St. Anthony Sand Dunes tiger beetle) occupy specialized niches, and habitat modification can have dramatic effects on abundance. Preserving intact ecosystems is probably the best way of ensuring that invertebrate diversity is not lost.

St. Anthony Dunes Tiger Beetle

The St. Anthony Dunes Tiger beetle is strictly limited to sand dune habitats in Idaho. Many of these dunes are small, scattered or isolated, particularly in southcentral and western Idaho, suggesting that the dunes tiger beetle may be more vulnerable to extirpation or habitat disturbances in the long term than are other tiger beetle species. Adult density surveys conducted by Robert C. Anderson in 1989 and again in 2000 in the St. Anthony Sand Dunes indicate populations are stable (Anderson 2000). Current management of the St. Anthony Dunes Tiger Beetle follows the Habitat Conservation Assessment and Conservation Strategy for the Idaho Dunes Tiger Beetle (Idaho State Conservation Effort 1996).

Conflicts

Livestock Grazing—Several sources indicate that protection and enhancement of existing occupied habitats should be given highest priority for management to benefit sage-grouse. Domestic livestock (cattle and sheep) are widely distributed over most all BLM acres throughout the PA. Grazing management practices affect wildlife habitat in a variety of ways and may have positive, neutral, or

negative impacts on plant communities. Livestock management considerations that affect seasonal habitat needs for sage-grouse may need to be revisited.

Wildfire—Altered fire regimes, influenced by non-native cheatgrass, have affected sagebrush plant communities on thousands of acres of habitat on the Snake River Plain. Breaking this fire/cheatgrass cycle and restoring rangeland health to these areas is a major task.

Habitat Fragmentation—Roads built in relation to management of livestock, timber, hunting, recreation, mineral exploration and development, and other human activities affect sage-grouse from the actual physical disturbance and noise they create. Proposals for expansive energy corridors and wind power within the PA will need special consideration for siting and mitigation of impacts.

Mining Activities—The most prominent threat to Townsend's big-eared bats is destruction of roost sites, both maternity and hibernacula, which can occur through mine closure, renewed mining, recreational caving, and other roost-disturbing activities. This species is extremely sensitive to anthropogenic disturbance and has been documented to abandon roost sites after disturbance (Pierson et al. 1999).

2.11.3. Trends

Special status wildlife species diversity and abundance is directly tied to maintaining habitat diversity and quality. Sagebrush habitats are declining rapidly across western North America, with over 350 associated plant and animal species at risk of local or regional extirpation (Wisdom et al 2000). Within the PA, over half of the Wyoming big sagebrush has been converted to perennial grass and cheatgrass (BLM 2008b). Sage-grouse populations have declined to historic lows, particularly in the Big Desert and the northern and eastern sections of the Upper Snake PA (ISGA 2006). However, in the last 5 years, population numbers in these three areas have shown slight increases as indicated by lek route count data for male sage-grouse (ISAC 2006). Data collected through the process of implementing the Idaho Standards for Rangeland Health for the PA have generally shown improvements in native range conditions and riparian–wetland habitat conditions when compared to data used in earlier land-use planning cycles. In an exercise by the Idaho Sage-grouse Science Panel, seven geographic areas were evaluated and prioritized with respect to relative likelihood of sage-grouse extirpation based on trends of habitats, threats, and populations (Appendix E, ISAC 2006). Areas within the Big Desert received an intermediate concern based on wildfire, but remaining areas (e.g., mountain valleys) were considered relatively intact with fire relatively uncommon, overall good ecological condition, and a low risk of extirpation within the next 25–50 years.

2.11.4. Forecast

Maintaining and improving habitat for special status wildlife species within the PA presents new challenges as landscape changes manifest themselves in the future. For example, sagebrush habitats have been substantially reduced in area and quality in the PA because of wildfire frequency and cheatgrass invasion. Habitat fragmentation from development and other land uses, restoration of degraded habitats, and management of livestock grazing are other key issues that concern BLM in managing habitats for sensitive species. The Conservation Plan for the Greater Sage-grouse in Idaho (ISAC 2006) has identified 13 planning areas where sage-grouse restoration efforts will be focused. Three of these planning areas exist within the Upper Snake PA and are represented by active local working groups (LWGs). BLM's

involvement in the development and implementation of locally driven, consensus-based plans will be a major part of conservation efforts.

Limited distribution of riparian–wetland habitats in the PA and subsequent habitat degradation leave many of the area's sensitive species particularly vulnerable. Historically, the main natural disturbance that shaped the landscape within the Snake River floodplain was annual spring floods. Today, with river flows regulated by dams, these changed flow regimes reduce cottonwood regeneration and establishment of other riparian–wetland species. Other human-induced disturbances that have changed the quantity and quality of riparian–wetland habitats within the PA include livestock grazing and expansion in recreation use and development.

2.11.5. Key Features

The varied habitat within the FOA supports a wide variety of special status species. The northern and eastern forests within the FOA provides additional habitat for the recovered population of Yellowstone Grizzly Bears to expand into.

The South Fork of the Snake River corridor supports the most abundant population of yellow-billed cuckoos in Idaho where it is considered a rare and local summer resident (66 FR 143, 2001). Recent surveys indicate nesting is likely in five different areas along the South Fork (Reynolds and Hinckley 2005).

The rivers in eastern portion of the PA also support greater than 30% of the breeding population of bald eagles in Idaho. The majority of nests are located along the South Fork, lower Henry's Fork and Teton River while the remaining nests are located primarily along the upper Henry's Fork (Idaho Greater Yellowstone Ecosystem Bald Eagle Research Team 2009).

Sagebrush obligate species rely on sagebrush for at least a portion of their life cycle. The vast and relatively continuous expanse of live, robust taller sagebrush with a good grass and forb component provides habitat required for all life cycles (lekking, brood-rearing, and wintering) of sage-grouse (Braun et al. 2005) as well as breeding habitat for migratory song birds such as Brewer's and sage sparrows, sage thrasher, and loggerhead shrikes. Additionally, pygmy rabbits, also a sagebrush obligate, is found in suitable habitat throughout the FOA.

Extensive lava tubes in the northeastern and southwester portions of the planning area support state and regionally important winter roosts for Townsend's big-eared bats as well as a small number of western small-footed bats. These lava tubes also support a small number of Townsend's big-eared bat maternity roosts.

2.12. Wildlife

2.12.1. Indicators

Planning and management of wildlife habitat within the Upper Snake PA emphasizes ecosystem management. Management approaches are guided by the needs of priority wildlife species. Priority species are defined as those having high economic, recreational, social, esthetic, or scientific values (e.g., game species such as deer, elk, moose, upland game birds). Habitat condition is determined from baseline data on wildlife populations and vegetation inventories and measurements that reflect habitat quality. For example, indicators such as browse vigor, forage quality, vertical cover, and habitat fragmentation are used to measure habitat condition and trend for mule deer winter habitat to comply with goals of priority species habitats as identified in habitat management plans (HMPs), BLM guidance (e.g., BLM Manual 6600, BLM 1990) and policy such as the Idaho Standards for Rangeland Health (BLM 1997a). Through the process for implementing the Idaho Standards for Rangeland Health, BLM uses qualitative habitat indicators to evaluate rangeland health and associated wildlife habitats. For general wildlife, rangeland health assessments should show that Standards 2 (Riparian Areas and Wetlands), 4 (Native Plant Communities), and 5 (Seedings), are being met (BLM 1997a). Standard 2 requires riparian–wetland areas are in proper functioning condition appropriate for the soil type, climate, geology, and landform to provide for proper nutrient cycling, hydrologic cycling, and energy flow. Standard 4 requires native plant communities to be healthy, productive, and diverse native animal habitat and populations of native plants are maintained or promoted as appropriate to soil type, climate, and landform to provide proper nutrient cycling, hydrologic cycling, and energy flow. Standard 5 requires rangelands seeded with mixtures, including predominantly non-native plants, are functioning to maintain life form diversity, production, native animal habitat, nutrient cycling, energy flow, and the hydrologic cycle.

Wildlife management in the FOA is a cooperative effort between IDFG and the BLM. Technically, the IDFG is responsible for managing wildlife populations while BLM is responsible for managing wildlife habitat under federal law and BLM policy. In practice, however, the IDFG and the BLM work closely to develop plans and management approaches on public lands.

2.12.2. Current Condition

Vertebrate terrestrial wildlife species that occur in the Upper Snake PA include mammals, birds, and reptiles. Approximately 350 species of wildlife are seasonal or year-long residents of the PA. Important species or groups include the following:

- big game species such as pronghorn, mule deer, elk, white-tailed deer, moose, black bear, mountain lions, bighorn sheep and mountain goats,
- waterfowl such as duck, goose, and swan,
- wading birds such as common snipe, sand hill crane, and long-billed curlew,
- upland game birds such as sage-grouse, pheasant, chukar, gray partridge, ruffed grouse, blue grouse, mourning dove, and turkey,
- small mammals such as cotton-tailed rabbit, black-tailed jackrabbit; rodents such as least chipmunk and golden-mantled ground squirrel; bat species such as little brown bat,
- furbearers such as badger, bobcat, marten, weasel, raccoon, beaver, mink, and muskrat,

- predator species such as coyote, red fox, and skunk,
- raptors such as golden eagle, red-tailed hawk, great horned owl, and northern harrier,
- reptiles such as the sagebrush lizard, short-horned lizard, and western rattlesnake, and
- small land birds such as sage thrasher, Brewer's sparrow, and western meadowlark, and riparian-associated species such as the yellow warbler and veery.

The following sections provide descriptions of priority management species and their essential habitats found in the Upper Snake PA.

Mule Deer

Mule deer (*Odocoileus hemionus*) are the most important big game species in southern and eastern Idaho according to IDFG because of their relatively low numbers and high desirability to the public (Compton 1998). Mule deer are the most widespread big game animal within the PA and FOA, occupying most habitat types and with varying densities dependent upon population goals of the IDFG, habitat productivity, and seasonal distributions. The FOA contains year-long, seasonal habitats and crucial winter ranges. An estimated 2,000 deer are year-long residents of the FOA, and approximately 10,000 deer migrate from summer ranges on the NFSLs to winter in the FOA. **Figure A-9, Appendix A–Maps**, shows the general location of crucial seasonal and winter mule deer use within the PA. Forage (expressed in animal unit months, AUMs) was allocated to existing deer numbers within the FOA during the last land use planning cycle. While deer numbers generally remain at "threshold levels" for most analysis areas, there is concern that overall deer numbers may be declining within the region, and that hunters desire higher deer numbers than presently exist.

IDFG manages mule deer as a renewable, harvestable resource in the PA. Mule deer numbers are presently within management target goals with management focused on increasing mule deer numbers and herd quality throughout much of the FOA (IDFG 2007a). Although mule deer numbers have been stable to declining over the past 15 years their numbers remain far below the historic levels observed pre-middle 20th century.

Mule deer summer range is generally the mountain sagebrush cover type, with aspen being highly preferred. Winter ranges are variable across the PA. For example, in the Lost River Mountain winter ranges, deer winter on exposed slopes of mostly big and low sagebrush communities with lesser compositions of antelope bitterbrush and nearby mountain mahogany stands. In contrast, migratory deer using the Sand Creek desert winter on rather open south aspects of mountain and basin big sage communities with a prevalence of antelope bitterbrush. Numbers of deer increase during the winter or as animals migrate from the NFSL to traditional winter ranges or make shorter elevation movements to winter areas in the FOA. The better summer ranges occur at elevations above 6,500 ft in most of the mountain ranges. Year-long and winter ranges occur at the middle and lower elevations.

In the western side of the PA, e.g., the Lost River mountain range, deer seasonal movements are generally elevational, with some movement between mountain ranges. In the eastern side of the PA, the situation is reversed with many deer making seasonal migrations south or north to traditional winter ranges. Studies to evaluate habitat condition for mule deer have been established in some of the important management areas; however, survey methods are variable and have not been consistently applied across the PA.

Generally, winter habitat condition is poor to fair in the west half of the area, including the Big Desert, and good in the east half of the PA.

Climate differences between the east and west sides of the PA e.g., less precipitation on the west side, result in deer ranges of lower productivity. Lower range condition from historic over grazing and more recent issues of recurring wildfire and competition from invasive species are putting additional pressures on these habitats. Competition with an expanding elk population has also put pressure on preferred habitat components such as mountain mahogany and antelope bitterbrush communities. Many mountain mahogany stands are mature even-aged stands with minimal recruitment. Several key winter ranges for migratory deer (e.g., Sand Creek Desert) are limited by available habitat and populations have fluctuated widely, steadily increasing during mild winters and declining with the next hard winter.

Pronghorn Antelope

The majority of pronghorn antelope (*Antilocapra americana*) habitat in eastern Idaho is found on BLM-administered public lands, and **Figure A-10, Appendix A–Maps**, shows the general location of crucial seasonal and winter pronghorn use. Habitats appear to be selected based upon availability and quality of forage, water, cover, slope (generally less than 20%) and visibility (Amstrup 1978). A study of forage preferences conducted in the P in 1981 found that browse species (i.e., sagebrush, saltbush, winterfat) maintained the highest relative density of species consumed while forbs were used when they were available (McCarty 1982). Not all shrub steppe habitats are occupied by pronghorn. Pronghorn tend to avoid habitat with particularly tall, dense shrubs that impede their ability to see and distance themselves from predators. According to the IDFG (2007b), populations of pronghorn are currently below desired levels, and the numbers of fawns for every 100 does have been declining since 1979 in the Birch Creek and Medicine Lodge areas of the FOA, according to IDFG surveys (IDFG 2007b).

Habitat use by different populations of pronghorn varies throughout the Upper Snake PA. In the Big Desert, limited habitat potential and wildfires have reduced the area's ability to support good numbers of pronghorn. Winter range is generally unrestricted but distribution is determined by annual weather changes. Mountain valleys in the Big and Little Lost River drainages support the most productive pronghorn herds. They may be present year-round with seasonal migration routes extending from the Snake River Plain through the valleys and toward their summits. In contrast, the Big Lost Valley has the least productive herds because of blocked migration routes and scarcity of quality winter ranges. Other pronghorn herds use productive summer habitat east of Interstate-15, but traditional winter ranges have been blocked by interstate making management difficult. Finally, pronghorn summering in the Henry's Lake flat area winter in the Madison Valley of Montana. While most of the herds associated with the Camas Creek tributaries will winter in Montana southeast of Dillon. Protecting migration routes between summer and winter ranges is important to the continued viability of pronghorn herds.

Elk

Rocky Mountain Elk (*Cervus canadensis*) are considered a very important big game animal in the PA and, consequently, receive a high level of management from IDFG and the BLM. An estimated 1,000 elk are year-long residents in the FOA, and approximately 6,000 elk migrate from summer ranges on the NFSL to winter in the FOA. **Figure A-11, Appendix A–Maps**, shows the general locations of crucial winter and seasonal habitat use by elk within the PA. Elk are found throughout the PA and numbers and distribution have increased substantially since the last land use planning effort. Overall, elk populations are near their all time highs. While elk numbers and elk hunters have increased, pressure on the resource

has also increased, making management of their habitats more important. Elk are generalists, occupying a wide variety of habitat types from sagebrush steppe to coniferous forests. Distribution and availability of these habitat components on seasonal range will ultimately determine the location and numbers of elk that may be supported.

As ecological conditions improve, elk continue to pioneer new areas indicating habitat carrying capacity may not have been reached within the PA and that populations may continue to increase. Generally, elk summer range within the PA is located on the NFSL, while crucial winter ranges for all the elk analysis areas managed by IDFG are mostly located and/or highly dependent upon habitat on BLM-administered public lands.

Since the last planning cycle, elk have expanded their use areas in the Lost River, Lemhi, and Beaverhead mountain ranges. Elk now occupy the INL and the Big Desert year-long, and in the Big Desert there are now elk hunting and harvest objectives. Livestock management changes in the late 70s, which included forage allocation to wildlife, livestock reductions, and implementation of grazing systems, have been positive factors in elk increases and habitat expansion. Additionally, since the late 1980s, an extensive artificial water development program in the Big Desert has improved water distribution for wildlife during late summer and fall. New water sources have expanded the range and strengthened populations of elk and antelope in this dry area.

Elk have occupied all areas east of Interstate 15 within the PA since recorded history. Presently, the Sand Creek Desert winters one of the largest groups of elk in Idaho. The protection and management of this habitat and associated migration routes has been the result of cooperative efforts from BLM, IDFG, the Idaho Department of Lands (IDL), USFS, and private landowners. Similar conservation efforts also exist to manage a large winter range for elk in the Tex Creek/Willow Creek area. Goals and objectives for elk in these areas continue to be managed in accordance with the Sand Creek Wildlife Management Area Long Range Management Plan (IDFG 1999) and the Tex Creek MOU (BLM 1981c), respectively. Habitat condition remains good for elk throughout the PA. Maintaining high-quality native range in the Sand Creek area and other areas on the east side of the PA will become challenging as winter range is more restricted and issues of land use and development become more acute.

IDFG uses elk management zones and game management units as the basis for elk population research and management. There are seven elk management zones (Lemhi, Pioneer, Beaverhead, Island Park, Teton, Palisades and Tex Creek) wholly or in part within the PA. Most objectives for adult bull populations are being met or exceeded in most game management units with notable exceptions in the Beaverhead and Island Park areas (IDFG 2007c). IDFG manages elk as a renewable, harvestable resource in the PA. Management is currently directed at distributing elk numbers appropriately across the PA.

White-tailed deer

Since 2004, white-tailed deer (*Odocoileus virginianus*) have been treated separately from mule deer in terms of management and hunting opportunities (IDFG 2005b). Among the new directions for management of white-tailed deer is an increase in working toward quality white-tailed deer habitats, and increased partnership interests with public and private land managers (IDFG 2005b). Harvest densities for white-tailed deer in the PA are relatively low; however, they are densely distributed along several key riparian areas of the Snake River, including the Main Stem and South and Henry's Forks.

Shiras Moose

There are four subspecies of moose in North America one of which, the Shiras moose (*Alces alces shirasi*), occurs within the PA. In particular, the eastern portion of the PA contains a very densely distributed population, as shown on **Figure A-12, Appendix A–Maps**. Habitat use varies by season with major concentrations along larger water bodies and riparian–wetland areas year-long.

Eastern Idaho provides a unique juxtaposition of topography and habitat types (i.e., mountains, valleys, shrubsteppe, riparian) that draws moose in from the surrounding areas (Henry's Fork and Teton Rivers, Big Bend Ridge, and Island Park) resulting in the largest desert wintering moose population in North America (BLM and IDFG 2009). The quality of shiras moose populations in eastern Idaho, based upon age structure and antler quality, is extremely high. For example, the annual average antler spread of harvested moose in the PA was consistently near 38 in. between 1990 and 2002 (Toweill and Vecellio 2004).

Water withdrawals reducing flow in perennial streams, channelization of river corridors, hardening of banks for flood control, and reduced flood frequency and magnitude have all reduced healthy riparian–wetland zones; thereby, reducing quality moose habitat. The trend toward improving riparian–wetland habitat quality on small parcels along the Snake River corridor and other areas has increased habitat value for moose, albeit on a scale much smaller than riparian–wetland habitat has been degraded or lost. Most of these riparian–wetland areas that are moose habitat are located on private property along the main rivers of the PA (South and Henry's Forks of the Snake, Teton, Big Lost, and Little Lost). BLM-managed public lands along these rivers are, therefore, even more important to maintaining quality moose habitats and populations. Crucial moose winter range has been identified on the southern and western edges of the Juniper Buttes in the Sand Creek Desert, overlapping with much of the Sand Creek deer and elk winter range.

Rocky Mountain Bighorn Sheep

Occupied habitat, approximately 20,000 acres throughout the PA, exists for Rocky Mountain Bighorn sheep (*Ovis canadensis canadensis*) within the Birch Creek drainages and the Big and Little Lost River drainages, as shown on **Figure A-12, Appendix A–Maps**. Winter ranges, within occupied habitat, are mostly sagebrush/grass vegetation types on south- and west-facing slopes. Sheep were re-introduced to these formerly occupied native ranges in the late 60s. IDFG manages bighorn sheep, and their management goals for the PA are to increase bighorn sheep populations, increase recreational opportunities (including viewing) associated with bighorns, and to increase harvest opportunities as well (IDFG 1990). There are currently no harvest opportunities in the PA, although bighorns exist in at least three population groups potentially using public lands.

Habitat potential has increased with abandonment of some domestic sheep range and improved range conditions. Conflicts have occurred with domestic sheep/bighorn in the three occupied ranges (Lost River, Lemhi, and Beaverhead). IDFG goals are to increase these remnant herds in all three mountain ranges.

Mountain Goat

Mountain goat habitat within the PA consists of winter range, which is limited to high cliffs and ridges of south and west-facing slopes with proximity to escape terrain (Taylor and Brunt 2007). Summer range is on adjacent NFSL-managed land and consists of alpine meadows interspersed with scree and talus,

conifers, and mountain mahogany. Mountain goats are classified as intermediate browsers and eat a variety of forage with a diet dominated by grasses in both winter and summer (Côté and Festa-Bianchet 2003). When forage is limited during the winter months their diet may be supplemented with twigs and needles of coniferous trees (Cote and Festa-Bianchet 2003). Occupied habitat on public lands has been identified in the Beaverhead Mountains in the upper Medicine Lodge drainage and in the Henry's Lake Mountains, as shown in **Figure A-12, Appendix A–Maps**.

Surveys in northwestern portion of the PA have shown dramatic decreases in goats counted, resulting in closure of mountain goat hunts based on populations not meeting IDFG objectives. No reasons have been given for these declines although mountain goats are sensitive not only to harvesting, but also to disturbance (Cote and Fester-Bianchet 2003). The Upper Snake FO is responsibile to manage for good habitat condition for the existing mountain goat populations.

The Henry's Lake mountain goat herd is an emerging population not yet of huntable density. The public lands within this area would be marginal habitat for goats, and likely only used by goats in the most extreme winters.

Black Bear

There is minimal habitat throughout the Upper Snake PA for black bears (*Ursus americanus*). However, they are known to occupy the mixed conifer habitat types of in the north, northwest, and eastern portions of the PA. They are also common throughout the South Fork drainage. In recent years, black bear harvest has increased markedly within the PA with a black bear harvest of 75 in 1994 to 243 in 2007 (BLM and IDFG 2008). Increases in hunting success may be a result of a variety of reasons including: drier-than-normal weather conditions, increased popularity of bear hunting, or the liberalized hunting season framework brought on by public perceptions of high predator populations and their potential negative impacts on deer and elk numbers (Nadeau et al. 2008b).

Upland Game Bird Species

Upland game birds constitute a very important group of species within the PA. BLM-administered public lands provide important year-long and seasonal habitat depending on species and location. Two native grouse species, the greater sage-grouse and the Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*), have undergone significant rangewide declines, and are discussed in more detail in **Section 2.11**, Special Status Species–Wildlife. Upland game bird habitat preference and general distribution are provided in **Table 2-24**.

Table 2-24. Upland game birds and habitat within the PA.

Species (Scientific Name)	Distribution, Requirements, and Habitat Issues
Chukar (*Alectoris chukar*)	Occurs in small flocks in foothills and canyon areas. Weather has a major influence on population numbers.
Gray Partridge (*Perdix perdix*)	Occurs mostly on agricultural areas and in surrounding low elevation sagebrush habitats. Population numbers are generally low in eastern Idaho.
Mourning Dove (*Zenaidura macroura*)	A migratory species found throughout the Upper Snake FOA and most common in low elevation shrub habitats and mountain valley

Species (Scientific Name)	Distribution, Requirements, and Habitat Issues
	regions of the PA. Highest densities on BLM public land occur where sagebrush communities are located adjacent to agricultural lands.
Ring-necked Pheasant (*Phasianus colchicus*)	Pheasants are tied to farmlands and use some adjacent public lands of shrub grassland. Current numbers are low compared to historic levels, as a result of changing farming practices. A few habitat improvement projects have been implemented on isolated tracts and additional opportunities exist.
Ruffed Grouse (*Bonasa umbellus*) Blue Grouse (*Dendragapus obscurus*)	Found along stream riparian and associated aspen and mixed conifer habitats in the northern portions of PA. On the FOA, fair numbers of ruffed grouse occur with lesser populations of blue grouse.
Wild Turkey (*Meleagrix gallopavo*)	Turkeys have been transplanted to forested habitats of the Main Snake River and South Fork of Snake River. Populations of Merriam's subspecies are increasing on the South Fork and turkeys are stable at low levels on the Main Snake River. Winter habitat is limited and wild turkeys concentrate around farm areas and livestock operations.

Waterfowl

Excellent waterfowl and shorebird habitat exists within the PA; however, the majority of these lands do not occur on BLM-administered public lands. Market Lake and Mud Lake Wildlife Management Areas, administered by IDFG, and the Camas National Wildlife Refuge, administered by the USFWS, are among the largest producers of waterfowl and are also important migration stopovers. Ducks (Family Anatinae) using the area for nesting include mallard, pintail, gadwall, teal, scaup, goldeneye, canvasbacks, redhead, ring-necked, and shoveler. Other major waterfowl production areas include the Henry's Lake and Island Park areas. Most waterfowl habitat found on public lands is along the South Fork of the Snake River and the Main Snake River to American Falls Reservoir. A variety of waterfowl exist, including a rather large and productive Canada goose (*Branta Canadensis*) population, on the South Fork. Canada geese numbers wintering in East Idaho on the Snake River and its tributaries have remained between 800 and 1800 from 1994 to 2005 (IDFG 2005c).

The most common nesting duck species are mallards and teal. The South Fork and main stem of the Snake River are important winter areas for ducks as well as providing nesting and brood-rearing habitat for wood ducks (Family Anatinaehave). Some waterfowl production takes place on smaller creeks along BLM public lands such as Medicine Lodge, Birch Creek, and the Little Lost River. Some waterfowl nesting will take place on the Big Desert associated with playas and reservoirs when rainfall is abundant. Waterfowl diversity is also high in these areas during spring migration when rainfall is average or above average.

Conflicts

Maintaining Habitat Quality and Protecting Crucial Winter Ranges—While much has been accomplished to protect the Sand Creek winter range, continued threats from development impact wintering herds when

they are forced to lower elevation ranges during above average winters (i.e., lower than average temperatures, high snowpack, etc., that produces late-season stress on wildlife). The construction of an animal-proof exclosure for a private elk hunting operation has resulted in the permanent removal of approximately 5,000–10,000 acres of wildlife habitat from the PA. The enclosure has the potential to increase competition among livestock and big game as food and space become more limiting. According to IDFG, approximately 75% of the Sand Creek deer herd uses this private land and adjoining public lands to the south for a majority of their winter range.

Livestock Grazing—Domestic livestock (cattle and sheep) are distributed over most of the public lands throughout the PA. Grazing management practices affect wildlife habitat in a variety of ways and may have positive, neutral, or negative impacts on plant communities. Decisions about grazing determine whether sufficient wildlife forage and cover is available, and whether important wintering, nesting and breeding habitats are protected.

Wildfire—Altered fire regimes, influenced by non-native cheatgrass, have affected sagebrush plant communities on thousands of acres of habitat on the Snake River Plain. Breaking this fire/cheatgrass cycle and restoring rangeland health is a major task.

Maintaining Connectivity for Wide Ranging Species—As the human footprint increases, long-distance migrations are disappearing. For instance, in the Greater Yellowstone Ecosystem approximately 60% of elk, 75% pronghorn, and 100% of bison migration routes have been altered or lost over the past 100 years (Berger 2004). In eastern Idaho, nearly all pronghorn winter ranges are already bisected by major roads, as shown as **Figure A-10**, **Appendix A–Maps**. Habitat fragmentation and alteration have increasingly occurred throughout the PA as a result of development such as water developments, fences, roads, and trails. Pasture fencing has fragmented habitat and is of particular concern to pronghorn, which have not adapted well to fences (O'Gara and Yoakum 2004). Additonally, roads built for timber, hunting, recreation, mineral exploration and development, and other human activities, have provided increased human access to big game habitat, which often increases wildlife's vulnerability to harvest. This increased access is a primary concern of wildlife managers (Compton 1998).

2.12.3. Trends

Wildlife diversity and abundance is directly tied to maintaining habitat diversity, availability, and quality. Historically, mule deer populations probably peaked in the west including southern Idaho (Leopold et al. 1947) in the late 1940s to early 1960s (Ballard et al. 2001). These increases were brought about by changes in the landscape in the late 1800s with huge herds of domestic livestock being brought into the state with subsequent overgrazing and a suppression of wildland fires (Clements and Young 1996).

2.12.4. Forecast

Maintaining and improving wildlife habitat within the PA presents new challenges as landscape changes manifest themselves in the future. For example, sagebrush habitats have been substantially reduced in area and quality in the PA because of wildfire frequency and cheatgrass invasion. New development and recreational uses threaten historically crucial winter ranges and migration routes and create access into big game habitat. Existing key and stronghold habitat must be better managed to offset losses. Several efforts that involve a bottom-up planning collaboration of diverse interests have resulted in the development of LWGs to try and reverse negative environmental trends. These groups have partnered

with federal and state agencies to develop plans to protect and enhance habitat for mule deer and declining habitat components such as aspen woodland. In 2007 at a statewide meeting of sage-grouse LWGs in Idaho, the groups were asked to identify the single-most important factor affecting sage-grouse in the next 10 years. Their response was overwhelmingly, habitat; namely conserving and improving existing key habitats and population strongholds.

The IDFG has re-structured their direction for manpower and field efforts throughout southern Idaho in an attempt to produce more mule deer, mule deer habitat, and hunting opportunities. In 2005, IDFG adopted the Mule Deer Initiative (IDFG 2007a), which directs them to increase mule deer populations, increase mule deer hunter satisfaction, and protect and improve mule deer habitat. As such, more efforts are likely to be geared toward benefitting mule deer and these primary goals.

2.12.5. Key Features

Hunting and fishing are important activities for the local and national public. The large, relatively undisturbed, open space found within the Upper Snake PA provides excellent habitat for pursuing big game and game bird species.

The unique juxtaposition of topography and habitat types (i.e., mountains, valleys, riparian–wetlands) in the Sand Creek WMA draws moose and elk in from the surrounding areas (Henry's Fork and Teton Rivers, Big Bend Ridge, and Island Park) resulting in the largest desert wintering moose population in North America (BLM and IDFG 2009) and the largest wintering elk herd in Idaho (IDFG 1999). The importance of big game within the PA is emphasized by closing approximately 430,000 acres to human entry closures to minimize disturbance of big game during critical winter seasons.

There are several major river corridors within the PA boundaries including the Teton, Henry's Fork, and Snake Rivers. These corridors provide important migration routes and stopover points, as well as nesting habitat, for migratory songbirds and raptors. Both moose and white-tailed deer can be found year round along the Snake River Corridor. The Teton River is an important seasonal migration route for elk and mule deer, and the Teton, Snake and Henry's Fork Rivers are world-renowned for their sport fishing.

The many lava flows and lava tubes within the PA provide cover, nesting and denning habitat for migratory songbirds, small mammals, reptiles and a few raptor species.

This page left intentially blank.

2.13. Fisheries and Aquatic Species

2.13.1. Indicators

Fisheries indicators reflect the types, composition, structure, diversity, and relative abundance of fish within the PA, as well as distribution, patterns, and connectivity of fish populations.

The indicators are used to assess the functioning and sustainability of aquatic ecosystems by considering species occurrences, population trends, aquatic habitat quality (including riparian–wetland), and habitat trends. The integrity and quantity of aquatic habitats is a critical indicator for the status and prospects of native cold water species, such as the Yellowstone cutthroat trout (YCT, *Oncorhynchus clarki bouvieri*), mountain whitefish (*Prosopium williamsoni*), and bull trout (which is also a special status species), three of the principal fish species of concern.

These indicators are evaluated through the Idaho Standards for Rangeland Health assessment process, which includes in-stream habitat, riparian–wetland, and MIMs monitoring, population surveys, and field observations.

2.13.2. Current Condition

The hydrologic systems of the Upper Snake River Basin are one of two types. The first of which is the Snake River and its tributaries, including the South Fork and Henry's Fork of the Snake River, Willow Creek, and the Teton River. This system was extensively connected in its pre-settlement condition. Restoring connectivity would be difficult because of irrigation infrastructure and flood control dams. The other hydrologic system is the sinks drainages, which includes the Big Lost River, Little Lost River, Birch Creek, Medicine Lodge Creek, and Camas–Beaver Creek drainages. The sinks drainages are hydrologically isolated stream basins located along the northern rim of the ESRP in Idaho. These streams originate in the mountains of central and southeastern Idaho and flow in a southerly direction where they sink into basalts of the Snake River Plain. Although these drainages are located within the Snake River basin, the immense lava flows of the Snake River Plain prevent the streams from forming surface-water connections with other streams and the Snake River. Another consequence of the lack of connectivity of the sinks drainages is the difference in native species found in the individual drainages. These stream systems are fairly natural in their flow regimes (i.e., no major dams, reservoirs) with only the Big Lost River having streamflows influenced by a major irrigation impoundment, the Mackay Reservoir. Only one-third of the Big Lost River Basin, the area downstream of the town of Mackay, Idaho, is located within the Upper Snake PA, and Mackay Reservoir is located upstream of that area.

Potential fisheries habitat administered by the Upper Snake FO includes 652 miles of perennial rivers and streams, 41 miles of intermittent streams, and 105 acres of lakes and reservoirs. Fish found within the PA are representative of those species found within the Columbia Basin. Native species include YCT, bull trout, mountain whitefish, Utah chub (*Gila atraria*), Utah sucker (*Catastomus ardens*), mountain sucker (*Catastomus platyrhynchus*), longnosed dace (*Rhinichthys cataractae*), speckled dace (*Rhinicthys osculus*), redside shiner (*Richardsonius balteatus*), mottled sculpin (*Cottus bairdi*), shorthead sculpin (*Cottus confuses*), and Paiute sculpin (*Cottus beldingi*). Introduced species include rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), lake trout (*Salvelinus namaycush*), brook trout (*Salvelinus fontinalis*), kokanee (*Oncorhynchus nerka*), smallmouth bass (*Micropterus dolomieu*),

common carp (*Cyprinus carpio*), yellow perch (*Perca flavescens*), and white sturgeon (*Acipenser transmontanus*).

Cold water fisheries are an important resource, both biologically and economically. The South and Henry's Forks of the Snake River, Henry's Lake, and the Teton River are worldwide-renown destination fisheries. The income generated by this resource in the local economy is significant.

The condition of fisheries habitat is intrinsically linked to the condition of the adjacent riparian–wetland habitat and also the stream channel characteristics. Riparian–wetland vegetation moderates water temperatures, adds structure to the banks to reduce erosion, provides overhead cover for fish, and provides habitat for terrestrial prey species.

Intact vegetated floodplains dissipate stream energy, store water for later release, and provide rearing areas for juvenile fish. Water quality, especially in regard to factors such as temperature, sediment, and dissolved oxygen, also greatly affects fisheries habitat.

Aquatic Invertebrates

Limited information is available on aquatic invertebrates in the PA. The presence of invertebrates that are found only in clean water, such as certain stoneflies (Family Plecoptera) and mayflies (Family Ephemeroptera), indicates good stream conditions. The salmonfly (*Pteronarcys californica*) hatch on the South and Henry's Forks of the Snake River is an important contributor to fishing success; therefore, economically important to the outfitters and fly-fishing retailers in the area.

Springs are a source of unique, often endemic, assemblages of invertebrates that are adapted to the constant temperatures and distinctive geothermal environments that springs provide.

Conflicts

Potential threats to aquatic species include genetic introgression with non-native fish, impoundments, water diversions, road culverts, improper livestock grazing, mineral extraction, angling, and competition with nonnative species. Whirling disease has been identified as a more recent potential threat. Throughout the entirety of the Upper Snake PA, livestock grazing practices continue to be the greatest concern to the health of fisheries habitats.

The Snake River is an internationally recognized trout fishery. Around this fishery a substantial outfitter and guiding industry has developed. Between the general public and the outfitters on the river, a high demand has been put on the fishery resource. The primary species sought after by anglers are the native YCT and rainbow trout, and the introduced brown trout. Also of interest to anglers are native mountain whitefish and lake trout. If recreational fishing continues to increase, fish populations could directly be affected through increased catch rates and indirectly by recreation user impacts to habitats, such as bank deterioration, vegetation removal, and introduction of pollutants to water bodies.

The introduction and subsequent spread of non-native trout has been one of the greatest threats to the status of YCT since stocking in YCT habitats first began over 100 years ago. Competition, predation, and hybridization from other salmonids including rainbow, brook, and brown trout, as well as genetically compromised cutthroat, continue to pose a threat to the expansion and conservation of YCT.

The New Zealand mudsnail is a small (0.13 in.) introduced snail species that, up until this time, has not been found upstream of Shoshone Falls on the Snake River. It has, however, been found in the Yellowstone, Bighorn, Missouri, Firehole, and lower Gibbon rivers in Montana. This snail has the ability to reproduce quickly and assemble in high densities, in the neighborhood of 46,000/ft^2, which is a major cause for concern for the health of western streams. Because both the Henry's and South Forks are known for their quality trout fishing, there is concern that the mudsnails will impact the food chain of native trout and alter the physical characteristics of the streams themselves. Research is needed to determine the impacts of large populations of mudsnails on the native fauna and the physical environment.

The rapid spread of the mudsnail throughout the Yellowstone watershed may have been assisted by human transport. Mudsnails are able to withstand desiccation, a variety of temperature regimes, and are small enough that many types of water users (e.g., anglers, swimmers, picnickers, and pets) could inadvertently be the mechanism for interbasin transfer of this nuisance.

No other aquatic nuisance species have at this time been found in the Henry's and South Forks of the Snake River, but whirling disease exists in nearby waters. Because the Henry's and South Forks' sport fisheries are destination fisheries, the proximity of these streams to other fisheries that have been invaded by nuisance aquatic species makes infestation of both the South and Henry's Forks very possible. An angler could fish an infected stream outside of the PA in the morning and easily be in one of these two streams in the afternoon, or other PA waters, and introduce an aquatic nuisance species, which could have a very adverse impact on aquatic species in these waters.

2.13.3. Trends

Fisheries and aquatic habitat declined, as a result of human influences and activities, from the time of European settlement to the last half of the twentieth century. Examples of these activities include grazing, logging, road construction and maintenance, water diversion from natural waterways, increased recreational activities, and commercial activities. Natural phenomenon, such as periods of prolonged drought in combination with human influences, also contributed to habitat decline. Lack of proper aquatic habitat management throughout much of the 20th century, amidst increasing human occupancy, and land and recreation uses within the PA resulted in decreased water quality and loss of natural aquatic habitats.

With the awareness of the importance of healthy riparian–wetland areas and federal and state regulations mandating improvement in water quality, fish habitat conditions began improving around the turn of the century. State and federal fisheries management agencies have started protecting native species through a a variety of measures, which has included the removal of introduced species that threaten native species.

A more recent threat to aquatic resources has been the introduction of nuisance species, both terrestrial and aquatic. Riparian–wetland areas have become infested with numerous weed species, including leafy spurge (*Euphorbia esula*), salt cedar-tamarisk (*Tamarix ramosissima),* and musk thistle (*Carduus nutans*) that threaten the ability of streambank vegetation to provide bank stability and water shading. Introduction of aquatic nuisance species, including Eurasian watermilfoil (*Myriophyllum spicatum*), whirling disease (*Myxobolus cerebralis*), New Zealand mudsnails (*Potamopyrgus antipodarum*), and Quagga mussels (*Dreissena bugensis*), pose a threat to aquatic food chains and water borne recreational activities. The *Idaho Aquatic Nuisance Species Plan* (Idaho Invasive Species Council Technical Committee 2007) describes the distribution of aquatic nuisance species in the PA. New Zealand

mudsnails, whirling disease, purple loostrife, and salt cedar are present in portions of the PA. The other nuisance species may become established in area waters in the future.

2.13.4. Forecast

Drought, dewatering of streams, wildfire, stream channelization and non-native fish expansion will continue to contribute to declines in fisheries habitat quality and native fish populations. Resource management decisions to reestablish fisheries and aquatic habitat, implement grazing strategies that improve riparian–wetland resources, and protect key habitats within the PA should reduce the degree of decline.

Continued appropriate seasonal livestock grazing, usually during the early season, is critical to protecting fish and aquatic habitats and to meeting the established BLM management goals and obligation to protect wetlands and waters.

Global climate change may affect cold-water aquatic species. According to a recent report drafted by the EPA: "There is now high confidence that anthropogenic emissions of greenhouse gases and aerosols has resulted in warming, with evidence of globally increasing air and ocean temperatures," (IPCC 2007). The future effects of this warming are potentially adverse for aquatic species, such as trout that depend upon cold water. These effects may result in changes in aquatic community composition, phenology (biological phenomena such as breeding as it relates to climate), number of reproductive cycles, evolutionary adaptations, and genetic selection. The effect to cold water aquatic species, including bull trout, a species particularly adapted to colder waters, would be to reduce or restrict their distribution to higher elevations.

2.13.5. Key Features

The key features for fish and aquatic habitat are the watersheds associated with waters containing aquatic species. These areas include five sink drainages (the Big Lost River, Little Lost River, Birch Creek, Medicine Lodge Creek, and the Camas–Beaver Creeks) and the Snake River drainage, which includes the Teton River, the South and Henry's Forks of the Snake River, and Henry's Lake. Also critical to health and abundance of fishery resources are wetlands, riparian–wetland habitats, perennial and intermittent streams, and springs.

2.14. Special Status Species—Fisheries and Aquatic Species

Special status fish and aquatic species include listed (T&E), candidate, proposed, state-listed, and BLM sensitive species, which are designated by state and federal agencies (BLM 2008c). There are currently 7 special status fish or aquatic species that are known to occupy or have potential habitat within the Upper Snake FOA. Of these 7 species, 1 is federally listed as endangered, 1 is listed as threatened, and the remaining 5 are BLM sensitive species.

The Utah valvata snail (*Valvata utahensis*) is a federally-listed endangered species found from the lower lower Henry's fork to the confluence with the South Fork, and down the main stem of the Snake River to the southern boundary of the Upper Snake PA. Public lands within the PA provide habitat for the native bull trout (*Salvelinus confluentus*), federally-listed as threatened. The USFWS proposed to delist the Utah valvata snail in July 2009 and a final decision is pending.

Two species of fish in the PA have been petitioned for listing, the YCT and Big Lost River population of mountain whitefish (*Prosopium williamsoni*).

In 1998, the YCT was petitioned for listing as a threatened species under the ESA, but the USFWS determined that listing was not warrented (66 FR 37, 2001). The mountain whitefish was petitioned for listing under the ESA in 2006. The USFWS determined in 2008 that listing also wasn't warrented. Currently, the mountain whitefish is undergoing a court-mandated status review by the USFWS (74 FR 150, 2009) who will publish a 12-month finding in 2010.

The most recent aquatic sensitive species list was published for Idaho in 2003. Since that time species and or habitat inventory has found additional species to include and others that need to be dropped from the list. For example, the westslope cutthroat trout and Bliss rapids snail have been removed and Utah valvata snail and the Big Lost River population of mountain whitefish have been added.

2.14.1. Indicators

Special status aquatic species indicators are the same as indicators for fisheries and aquatic species in general and are presented in **Section 2.13**, Fisheries and Aquatic Species.

2.14.2. Current Conditions

Appendix B, Idaho BLM Special Status Species Ranking Protocols 2003, goes into detail about the rankings, or classifications, of special status species. **Table 2-25** presents the special status fish and aquatic species in the Upper Snake FOA as of May 2009 and includes the IDCDC ranking and IDFG status (see **Appendix B**).

Bull trout historically occupied and are still found in the Little Lost drainage. The Big Lost River drainage was the historical and is the present habitat for a genetically unique population of mountain whitefish. The Snake River drainage was historical and is present habitat for the YCT, shorthead sculpin, and Utah valvata snails.

Table 2-25. Special status fisheries and aquatic species in the PA.

Species	Scientific Name	Idaho Conservation Data Center Ranking[a]	Idaho Fish and Game Status[a]	BLM Type[a]
Fish				
Bull Trout	*Salvelinus confluentus*	G3, S3	Game Fish, Threatened	1
Mountain Whitefish (Big Lost River population)	*Prosopium williamsoni*	–	–	5
Shorthead Sculpin	*Cottus confuses*	–	–	5
Yellowstone cutthroat trout (Fine spotted and large spotted varieties)	*Oncorhynchus clarki bouvieri*	G4, T2, S2	Game Fish	2
Amphibians				
Northern Leopard Frog	*Rana pipiens*	G5, S2	Protected Nongame	2
Western Toad	*Bufo boreas*	–	–	3
Aquatic Invertebrates				
Utah Valvata Snail	*Valvata utahensis*	G1, S1	–	1

a. Rankings are defined in Appendix B, Idaho BLM Special Status Species Ranking Protocols (2003)

The Little Lost River has been designated as a recovery area for federally-listed bull trout. The Henry's Fork, below Beaver Dick Park, and the main stem of the Snake River, below the confluence of the Henry's Fork, and the South Fork have been designated as recovery areas for federally-listed Utah valvata snails.

Potential threats to aquatic special status species include hybridization with non-native fish, impoundments, water diversion, road culverts, improper livestock grazing, mineral extraction, and competition with nonnative species. In the case of amphibian special status species agricultural, residential and commercial runoff that ponds in occupied habitats is also a threat. Chemicals found in the runoff can directly impact populations by weakening or killing individuals or indirectly by eaffecting reproduction or causing genetic mutations.

Impacts to the health of all cover types can impact aquatic habitats by changing sediment delivery rates, water temperature and contaminants and nutrients entering the water. The most important cover types (see **Section 2.8**, Vegetation—Upland Vegetation and Habitats) in relation to aquatic species are riparian and open water. Riparian–wetland vegetation moderates water temperatures, adds structure to the banks to reduce erosion, provides overhead cover for fish, and provides habitat for terrestrial prey species.

Table 2-26 presents summary descriptions for the seven fish and aquatic SGCN. The health of vegetation cover types impacts the quality of aquatic species habitat. The condition of special status fisheries and

other cold water aquatic species habitat is intrinsically linked to the condition of the adjacent riparian–wetland habitat and also the stream channel characteristics. Lotic and lentic riparian–wetland areas throughout the PA are potential habitats for leopard frogs and western toads.

Table 2-26. Descriptions, requirements, and habitat issues for special status fisheries and aquatic species.

Species	Distribution, Requirements, and Habitat Issues
Fish	
Bull Trout	An isolated population is found in the Little Lost River and some of its tributaries. Fragmentation and isolation of bull trout populations or subpopulations has occurred through habitat changes caused by human activities. Overfishing and competition by introduced species of fish have restricted the distribution of bull trout to a small portion of the original range. The original populations have been restricted in the number of individuals they contain, their resilience, and in their proximity to or connection with other populations.
Yellowstone Cutthroat Trout	Yellowstone cutthroat are found in the upper Snake River drainages and the Medicine Lodge Creek and Beaver-Camas Creek sink drainages. Reduction in historically occupied range, habitat loss, fragmentation of current habitat, isolation of existing populations, and hybridization with rainbow trout and other subspecies of cutthroat trout are the principal issues facing Yellowstone cutthroat trout
Mountain Whitefish (Big Lost River population)	The Big Lost River population of mountain whitefish was petitioned for listing but was determined not warranted. These whitefish are unique in both genetics and appearance and may be a separate species from other mountain whitefish populations. Range of these whitefish is in the Big Lost River. Possible reasons for their decline include dewatering of the river for irrigation, migration barriers, entrainment of fish in irrigation canals, overharvest from angling, competition and predation from introduced species, habitat alteration, and whirling disease.
Shorthead sculpin	Shorthead sculpin are found throughout the Snake River, its tributaries, and the sink drainages within the PA.
Amphibian	
Northern leopard frog	The northern leopard frog is associated with permanent water sources during all life stages. Populations occur in a variety of wetland situations, including marshes, pond margins, and slow moving sections of streams and rivers. The northern leopard frog is widely distributed across much of northern and central North America, but populations are sparsely distributed in the western portion of its range. In southern Idaho, populations have been reported in the Snake River and its tributaries, including the Boise, Payette, and Weiser rivers in the southwest, and the Portneuf River, Bear River, and Marsh Valley in the southeast. The distribution along the mainstem Snake River extends discontinuously as far downstream as southern Washington County. Documented in areas of low fish densities in the Henry's Fork of the Snake River from Teton River confluence to South Fork confluence. As with most amphibians, the loss and degradation of wetland and riparian habitat is thought to be the most prevalent threat to populations. Urban and agricultural development, pollution from agricultural runoff, mining and mineral processing, water withdrawal and diversion, livestock

Species	Distribution, Requirements, and Habitat Issues
	wastes, and trampling of habitat are the most pervasive stressors to wetland systems. Introduced competitors and predators, such as bullfrogs and sport fishes, can cause amphibian population declines and losses. Disease is also a concern, particularly the chytrid fungus, *Batrachochytrium dendrobatidis.*
Western Toad (Boreal Toad)	Generally, the boreal toad will only be found in areas that are good breeding grounds, such as lakes, marshes, and ponds in spruce-fir forests and alpine meadows. While the boreal toad used to be quite abundant, it has been suffering severe population declines since the 1970s.The boreal toad had been a candidate for protection under the ESA, but in September 2005, the USFWS announced that it was dropping it from the list. Their reasoning for this was that the boreal toad is a subspecies of the western toad, and until it can be shown otherwise, it doesn't warrant special protection.
Aquatic Invertebrates	
Utah valvata snail	The Utah valvata is documented to occur in the Snake River basin of southern Idaho from the lower Henry's Fork as far downstream as Grandview. The Utah valvata inhabits varied substrates including silt, sand, and sub-aquatic vegetation. The species is generally found in shallow, slow moving, well-oxygenated water. The species is not known to use areas with heavy currents or rapids. The range of the snail in the Snake River has been found to be larger than it was thought to be when the species was listed.

Potential threats to aquatic special status species include genetic introgression with non-native fish, impoundments, water diversion, road culverts, ivestock grazing, mineral extraction, angling, and competition with nonnative species. Whirling disease has been identified as a more recent potential threat.

Conflicts impacting special status species are similar to conflicts affecting fisheries and aquatic species in general and are presented in more detail in **Section 2.13**, Fisheries and Aquatic Species.

2.14.3. Trends

Special status fisheries and aquatic species trends are the same as trends impacting fisheries and aquatic species in general and are presented in **Section 2.13**, Fisheries and Aquatic Species.

2.14.4. Forecast

The forecast for special status fisheries and aquatic species is the same as the forecast for fisheries and aquatic species in general presented in **Section 2.13**, Fisheries and Aquatic Species.

2.14.5. Key Features

The key features for aquatic special status species habitat are the watersheds associated with waters containing those species. These watersheds include the Big Lost River, and its population of mountain whitefish; Little Lost River, Medicine Lodge Creek, the Camas-Beaver Creeks and the Snake River drainage, which includes the Teton River, the South and Henry's Forks of the Snake River, and Henry's Lake.

The key features for aquatic special status species habitat are the watersheds associated with waters containing those species. These include the mountain whitefish population in the Big Lost River, bull trout in the Little Lost River and YCT in Medicine Lodge Creek, the Camas-Beaver Creeks and the Snake River Drainage, which includes the Teton River, the South and Henry's Forks of the Snake River, and Henry's Lake. Utah valvata are found in the lower portion of the Henry's Fork and the Snake River below the confluence of the South Fork and the Henry's Fork. In addition northern leopard frogs and western toads need relatively clean year-round lentic or lotic water sources.

Key features for special status species habitat are similar to that for cold-water fisheries in general, which is discussed in **Section 2.13**, Fisheries and Aquatic Species.

This page left intentionally blank.

2.15. Cultural Resources

The BLM is responsible for identifying, recording, protecting, managing, and enhancing archaeological, historic, architectural, and traditional cultural values located on BLM-administered public lands, as well as those that might be affected by BLM undertakings on non-federal lands. The BLM manages cultural resources in accordance with existing laws, regulations, EOs, and policy guidelines. The principal federal law addressing cultural resources is the National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 1A § 470 et seq.), and implementing regulations (36 CFR III § 800 et seq.). The NHPA describes the process for identifying and evaluating historic properties defined as cultural resources eligible for, or listed in, the National Register of Historic Places (NRHP). The NHPA also provides the procedures for assessing the effects of federal actions on historic properties and consulting to avoid, reduce, or minimize adverse effects. Since 1998, the Upper Snake FO has met its NHPA responsibilities though a protocol agreement with Idaho's State Historic Preservation Office (SHPO). The Upper Snake FO cultural resources program manages archaeological remains, historic values, and traditional lifeway values important to the Shoshone–Bannock and other native peoples.

2.15.1. Indicators

Site deterioration occurs when natural or human-generated actions directly and indirectly remove, alter or destroy attributes, features and elements that constitute a cultural site or property. This deterioration affects the values that make the site or property important for socio-cultural, scientific or other uses. Indicators that reflect the physical condition of cultural resources include four general categories:

- Loss of Features: Natural weathering, decay, erosion, intensive recreation use and vandalism can remove elements that originally constituted a cultural resource. This loss affects the completeness and accuracy of the information used by professionals and degrades the quality of the resource for socio-cultural or scientific use.
- Modification of Physical Relationships: Scientific study of cultural resources is related to the accuracy of the vertical and horizontal measurements among elements of the site. Displacement of original physical relationships reduces the reliability, or may completely negate, the significance of measurements needed to reconstruct the activities and sequence of events at a site.
- Modifications of Characteristics: The utility of a cultural resource is often dependent upon the physical, chemical, functional, and aesthetic characteristics of the elements of the site. Changes in these characteristics occur through the processes of decay, leaching, chemical exposure, and the effects of high temperature from wildfires.
- Intrusions or Modifications of Features: Intrusions or modifications may affect the integrity of a site or a feature within a site. Construction of nuclear power facilities on or near a site may be inconsistent with the socio-cultural value, historical, or interpretive theme of a site or an entire area.

2.15.2. Current Condition

Cultural resources are definite locations of human activity, occupation, or use identified through field inventory, historic documentation, or oral evidence. Cultural resources include archaeological, historic, and architectural properties and sites or places of traditional cultural or religious importance to Native Americans (i.e., Shoshone–Bannock Tribes, Nez Perce) or other social or cultural groups. Cultural resources are also the products of human history such as items produced by human workmanship or use

and elements of the natural environment altered by human activities. Products of human activity are usually more than 50 years old before they are considered cultural resources. However, sites, structures, or objects related to significant historical events that are less than 50 years old can meet the test for a cultural resource.

Cultural resource sites in the FOA represent continuous human occupation and use dating from at least 11,000 years before present (BP) to the present. A date of 11,000 years BP was obtained from cultural deposits at Owl Cave (i.e., at the Wasden Site) located on private land east of the INL boundary about 20 mi west of Idaho Falls. Prehistoric and historic Native American sites in the PA include seasonal campsites, stone tool making areas, stone tool caches, food processing and kill localities, trails, quarries, rockshelters, rock alignments, rock rings, rock cairns, and pictographs/petroglyphs. Open lithic sites or stone flake and tool scatters indicate seasonal or temporary campsites. Rockshelters, particularly larger shelters and overhangs, indicate a longer-term residential site. Pictographs or petroglyphs and rock cairns (stacked rock features) are usually associated with Native American religious and traditional cultural practices.

Historic Euro–American sites in the FOA include homesteads, cabins, irrigation structures, mineshafts and adits, abandoned railroad grades, abandoned ski areas, emigrant trails and wagon roads, stagecoach stations, debris scatters, trash dumps, Civilian Conservation Corps (CCC) rock reservoirs and camps, inscription rocks, ferries, and other manifestations of 19th and 20th Century Euro–American exploration, occupation, and economic development in southeastern Idaho. Stagecoach and wagon roads connected mining camps of central Idaho and western Montana with the Union Pacific Railroad at Corinne, Utah. Early roads also connected Union Pacific stations at Ashton, Dubois, and Spencer to National Parks.

Typically, wooden or stone cabins within the FOA were homes for miners, ranchers, or farmers. Line shacks and corrals, rock walls or other rock features, fence lines, trails and graves are often associated with mining or farming activities. Shafts, adits, tailings piles, mill sites are related to lode mines. Historic farming or ranching sites are generally located in the Lost River valleys and on the Snake River Plain near springs or rivers.

Culture History Overview

Prehistoric Summary

Archaeologists, historians, and ethnographers have developed several cultural historical chronologies for south–central and southeastern Idaho. This region is ethnographically part of the Great Basin Culture Area and is contiguous with the Columbia Plateau Physiographic Province (Fenneman 1931). Plew (2000) proposes three cultural periods for the Snake River Plain. They include the Paleo-Indian, or Big Game Hunting Period (15,000–7,800 years BP), the Archaic Tradition (7,800–300 BP) and the Proto-Historic/Historic Period (300 BP–present). Ringe, Reed, and Holmer's (1987) chronology distinguishes four general culture historic periods in the prehistory of the region. They are Early Prehistoric, Middle Prehistoric, Late Prehistoric, and Historic Periods. This system divides the Early Prehistoric Period into two sub-periods. Ringe, Reed and Holmer divide the Middle Prehistoric period into three sub-periods and the Late Prehistoric Period into two sub-periods. Ages and radiocarbon dates are presented in terms of uncalibrated radiocarbon years before present.

Early Prehistoric Period: 15,000–7,500 BP
The climate in southern Idaho at this time was wet and large, shallow ephemeral lakes were common water sources. The earliest known people of southern Idaho hunted extinct species of mammoth, camel, horse, and bison. Clovis and Folsom projectile points (i.e., hunting tool artifacts) represents this period's lithic technology. Archaeologists have recovered Clovis points as surface finds in the FOA.

Around 10,000 BP, projectile point styles in the region changed from fluted types to unfluted lanceolate and large stemmed points. Socket-base projectile points (e.g., Haskett) and stemmed styles (e.g., Alberta) characterize the Early Prehistoric II sub-period. Change in projectile point types coincides with declining large Pleistocene mammal populations. However, big game hunting continues through the period. Archaeologists have found sites containing Early Prehistoric II sub-period projectile points in southern Idaho in association with bighorn sheep and bison and Haskett points in association with bison remains dating between 9,800 and 10,000 BP.

Middle Prehistoric Period: 7,500–1,300 BP
A proliferation of point types marks this period. Large side-notched points decrease in frequency, and by about 4,000 BP, stemmed-base dart points (e.g., Gatecliff) become the dominant style in this region. Large corner-notched forms (e.g., Elko series) and smaller lanceolate points similar to the Humboldt series appear at this time. At the Wahmuza Site (Holmer 1986), very few Plains-type projectile points were manufactured from volcanic glass. However, the Great Basin projectile points were fashioned from obsidian or similar volcanic materials. Characteristic projectile technology was atlatl-and-dart. Archaeologists infer atlatl use from the emergence of bifurcate-stemmed points and large side-notched dart points. These changes may represent two versions of the atlatl (e.g., Great Basin and Northwestern Plains). On the Snake River Plain, the older of these appears to be the bifurcate-stemmed projectile points.

Middle Prehistoric Period native peoples used a broader range of plant and animal resources. Some sites indicate there was a preference for hunting bison (Butler 1968; Swanson 1972). Other sites exhibit a wide range of animal size and variety, or very little animal bone (e.g., Gruhn 1961; Miller 1972). At the Wahmuza Site (Holmer 1986), archaeologists recovered a hopper mortar base and numerous notched cobbles. Columbia Plateau ethnographers call these cobbles fishing weights. Wahmuza lanceolate projectile points appear during this period and continue through subsequent periods.

Middle Prehistoric III Sub-period: 3,600–1,250 BP
A wide variety of projectile point styles mark this period. However, Elko series, and other large corner-notched dart points are the most common point types. At the Wahmuza site (Holmer 1986, Ringe and Harding 1986), ceramics appear during this period. Rosegate points appear toward the end of this sub-period, as well as several small side-notched points similar to the Avonlea style from the Great Plains. Various lines of evidence suggest that the groups present during this period may have formed the population base from which the subsequent sub-period(s) developed. Holmer (1994) notes continuity in the archaeological record that may extend 4,000 BP, while Swanson (1972) pushes the date to 8,000 BP.

Late Prehistoric Period: 1,200 to150 BP
The Late Prehistoric Period is divided into two sub-periods. Late Prehistoric I sub-period extends from approximately 1,200–700 BP. Late Prehistoric II sub-period extends from about 700–150 BP. A reduction in the size of corner-notched projectile points (e.g., Rosegate) associated with bow and arrow technology,

and sporadic ceramics define the Late Prehistoric I sub-period. Diet is similar to the preceding Middle Prehistoric III sub-period with reduced bison consumption. Small and large corner-notched points are encountered with about the same frequency. However, desert side-notched projectile points constituted a quarter of the artifact assemblage. Wahmuza lanceolate points and notched cobbles persist into this period. Many of these cultural elements occur as part of the material culture of the historic Numic people (Steward and Wheller-Voeglin 1941; Jimenez 1985; Reed et al. 1986; Holmer 1994).

The Late Prehistoric II Sub-period

Occuring from approximately 700–150 BP (Ringe, Reed, and Holmer 1988), small side- and tri-notched projectile points such as the Desert Side-notched characterize this sub-period. Horses and European trade goods reached the area by 300 BP, and rough, historic pottery is common. At the Wahmuza site (Holmer 1986) occupations V and VI date to this sub-period. Occupation V contained the majority of a flat-bottomed Intermountain ware pots in association with desert side-notched points. A subsistence strategy heavily focused on the procurement of large animals also typifies this sub-period. However, evidence of plant or plant processing during this period is rare. It is unknown whether this pattern reflects a genuine lack of emphasis on the exploitation of plant resources, exploitation of different plant resources, different spatial organization of camp and procurement/processing areas, season of occupation, or sampling error.

Historic Summary

The first Euro–Americans in the FOA in the early 1800s were fur trapper–explorers. In the 1840s, the first Oregon-bound emigrants crossed the Snake River Plain. A 230-mi long northern alternate route of the Oregon Trail, the Jeffrey–Goodale Cutoff, crosses the PA as shown on **Figure A-13, Appendix A–Maps**. This route was used from 1852–1902 by emigrants, settlers, miners, and other southern Idaho travelers.

In the 1860s, silver, gold, and lead ore discoveries attracted the first miners to central Idaho and southwestern Montana. In the early 1880s, mineral discoveries in the Birch Creek, Big Lost and Little Lost River Valleys attracted miners and settlers to the FOA. Mines were generally lode mines and required stamp mills and smelters to process ore. In the 1890s, large placer mining operations attempted to separate very fine gold particles from the Snake River. However, lode mining remained an important, if diminishing economic activity into the 1950s. Placer mining continues today on a small scale.

The first settlers in southeast Idaho operated small ranches and raised horses. Settlers from Utah were attracted to the rich soils on the broad bench and bottomlands along the Snake River and began farming the area in the mid-1800s. Private land holdings in the planning area were obtained through the Acts of Congress such as the Carey Act (43 U.S.C. 14 § 641 et seq.), the Reclamation Act/Newlands Act of 1902 (Public Law 57–16), the Desert Land Act of 1877 (U.S. Statutes at Large 1877) resulting in settlement of the remaining arable land by 1930. Federally funded projects increased the scale of irrigation projects under these acts. Canal building in the Snake River Valley accelerated after 1879. By 1885, there were 28 canals in use or under construction. Early canals include the Stewart, Smith, Long, Island, Eagle Rock, Willow Creek, and Anderson. Later Carey Act canals include the Great Feeder, Springfield–Aberdeen and Marysville. The Reclamation Act/Newlands Act of 1902 enabled construction of dams and reservoirs required for larger scale irrigational and agricultural development projects, including construction of Palisades Reservoir in 1957 on the South Fork of the Snake River.

In 1877, conflicts with the U.S. Government forced the Nez Perce to attempt an epic flight into Canada. Several bands of Nez Perce led by Chief Joseph, Looking Glass, and other chiefs followed traditional routes to bison hunting areas leading from the White Bird Hill near the Salmon River east to Yellowstone National Park and north to Bear Paw Meadows near the Montana–Alberta border. The Nez Perce National Historic Trail runs southeast through the Birch Creek Valley and then east and northeast toward West Yellowstone, Montana, and is shown on **Figure A-13, Appendix A–Maps**. Sites related to the Nez Perce Trail in the PA include the Birch Creek Skirmish, Corrine–Bannack Stage Road, Hole-in-the-Rock Stage Station, Dry Creek Stage Station, Sam Glass Grave, Bugler Brooks Grave, General Howard's Camp Calloway, the Camas Meadows Battle Site (the Frying Pan) and Targhee Pass.

In 1879, the construction of the narrow-gauge Utah & Northern Railway north from Corinne, Utah, to Virginia City, Montana, accelerated eastern Idaho settlement. The Utah & Northern Railroad was absorbed by the Oregon Short Line, a subsidiary line of the Union Pacific Railroad. Construction of branch lines to Driggs, Victor, Mackay, St, Anthony, and Ashton, Idaho, in Idaho began in 1899 and continued in eastern Idaho until 1912 (Beal 1980). The railroad became an agent of settlement, community growth and economic development by providing access to remote and distant markets (Fiori 1981). Railroads in the 1880s literally ran on wood. They required wood for ties, fuel, and construction. In 1880, several sawmills were built and operated in Beaver Canyon near Spencer, Idaho (Sims 1979). In the early 1900s, timber operations expanded into the Island Park area to supply ties to the Union Pacific Railroad and its branch lines. National concerns about the overuse of timber resources led to the establishment of the Yellowstone Forest Reserve in 1891 and the Targhee National Forest in 1908.

In the early 1940s, the CCC built and operated a camp near Atomic City, Idaho. They built fire lookouts, roads, rock walled water catchments, and other works on the Snake River Plain. They also removed sagebrush and replaced it with drilled and seeded crested wheatgrass. The linear rock walls they built to collect snow in shallow reservoirs still stand at several locations. These sites are eligible for the NRHP.

During World War II, 174,000 acres of Snake River Plain public lands were withdrawn for military training and weapons testing purposes. Initially the area was used to test fire naval guns relined at a plant in Pocatello, Idaho. The Arco Naval Proving Ground would become a core area of the future INL. This reserve served as a center for U.S. Navy and Army ordnance testing until 1949. In 1949, the U.S. Atomic Energy Commission assumed administrative authority over the ordnance test area and designated it the National Reactor Testing Station, a remote installation devoted to design, testing, and development of nuclear reactor technologies. Since its formation, the INL has served a nationally and globally and critical role in basic research on the design, safe operation, and licensing of nuclear power and propulsion reactors. In 1951, one INL nuclear reactor, Experimental Breeder Reactor-I, generated the first usable amounts of electricity. The generated power lighted the homes and businesses of Arco, Idaho. The reactor is now a Registered National Historic Landmark.

Shoshone–Bannock Tribes

The various bands of the Shoshone, Bannock, and Paiute people roamed extensively throughout the Great Basin and Intermountain region. Prior to non-Indian settlement in the region, Indians used abundant natural resources and enjoyed the traditional cultural practices unique to their people. A discussion of the Shoshone–Bannock Tribe's socio-cultural ties and resource use of the Upper Snake PA is presented in **Section 2.16**, Tribal Treaty Rights and Interests.

Cultural Resource Site Summary

Cultural resource inventories have identified and recorded over 4,000 sites within the FOA. Sites are single component prehistoric or historic sites, or multi-component sites that feature multiple layers of Native American and Euro-American occupation encompassing several prehistoric and historic phases representing continuous occupation for millennia. Sites can range in surface area from a fraction of an acre to over 40 acres (1,742,400 ft^2). Rapid soil development and dynamic geomorphic events bury most sites with only a fraction of the cultural material exposed on the surface. However, site depth varies from surface deposits to over 9 ft deep.

Cultural resource survey work in the FOA began in the late 1950s, but was not common until the mid-1970s. BLM archaeologists have completed hundreds of cultural resource inventories in the FOA. They have completed inventories and evaluations for large-scale fire stabilization and fuels management projects and for small-scale livestock water systems, range fences, ROWs, land use permits, and lands and mineral material sales.

BLM personnel have conducted or funded cultural resource inventories for planning purposes and for scientific research. The 1974–75 Camas–Little Grassy, 1977 Little–Lost Birch Creek, and the 1979 Big Desert archaeological surveys were Class II (i.e., sample) cultural resource inventories that provided a basis for cultural resource management actions included in the FOA's land management plans of the 1970s and 1980s. In 1989, BLM and ISU archaeologists excavated portions of Bobcat Cave, a lava tube cave located on the Snake River Plain. The Idaho State Historical Society has published the results of these investigations in Prehistoric Cold Storage on the Snake River Plain: Archaeological Investigations at Bobcat Cave (Henrikson 1996). This monograph describes the results of studies of 4,000-year-old woven mats and stone, bone, and antler tools associated with ice and bones of bison and other large game animals that were once stored in this natural desert refrigerator.

In 1990, BLM directed FOs to mark segments of the Oregon National Historic Trail and its alternative routes across southern Idaho for the 1993 Oregon Trail Sesquicentennial. The Upper Snake FO used standard NPS-recommended methods to mark segments of the Oregon Trail and the Jeffrey–Goodale Cutoff (shown in **Figure A-13, Appendix A–Maps**). BLM developed a partnership with the Idaho Chapter of the Oregon and California Trails Association that continues to identify, mark, and map historic emigrant trail segments across public and private (with permission) lands in southern Idaho. The Upper Snake FO also works with the NPNHT Foundation to mark a trail route and interpret significant sites located along the trail.

In 1999, the BLM funded a partnership dedicated to recording pictograph and petroglyph sites in the FOA. This project initially focused on the pictograph sites concentrated within the boundaries of the Black Canyon WSA. Participants have identified, photographed, and recorded over 100 rock art sites in lava tube caves, limestone rockshelters, on rock panels and on isolated boulders. This work has created a permanent record of the type, variety, and distribution of rock art sites in the FOA and continues through 2010.

The Idaho SHPO database is the main cultural resource information source for the FOA. Through a data sharing agreement and partnership, Idaho BLM has collaborated with the Idaho SHPO to develop and share cultural resources data. Idaho SHPO annually updates this information and provides it to BLM FOs. Idaho SHPO and BLM FOs will continue to maintain and update information on documented cultural

resources and cultural resource investigations (e.g., cultural resource inventories) with current information. The Upper Snake FO uses this database to ensure that cultural resources are adequately considered in future planning and management actions. SHPO databases in general are the primary source of information that BLM uses to develop and present characterizations of known and expected cultural resources, including site types and densities in inadequately surveyed areas within the planning area.

The Birch Creek rockshelters (Bison and Veratic), Donald Mackenzie's Campground, and the Jeffrey–Goodale Cutoff are listed on the NRHP. The Camas Meadows Battle Sites (Howards's Camp Calloway and the Captain Norwood Encounter Area, or the Frying Pan) are two sites related to the NPNHT and are located on private and IDL lands located near Kilgore, Idaho, in Clark County. The NPNHT, Bobcat Cave, and other sites in the FOA have been determined eligible for listing on the NRHP. The Upper Snake FO would continue its efforts to recognize the significance of these properties through the preparation and submission of nomination to the NRHP.

The existing MFPs and the Medicine Lodge RMP included decisions concerning land use allocations and basic cultural resource management guidelines. They recommended compliance with the NHPA and other laws and identified priorities for future supplementary inventories, cultural resource management plan preparation, monitoring of known cultural resources, inventory of properties listed or eligible for listing on the NRHP, preservation of unevaluated resources until a determination of eligibility is obtained, and restrictions on livestock grazing in certain areas to protect cultural values.

Conflicts

Steady population growth in southern Idaho is anticipated to lead to increasing demands on resources within the FOA, including cultural resources. The Upper Snake FO anticipates increases in every type of recreational activity. OHV use should continue to increase with an attendant demand for additional trail access and the construction of staging and parking areas at trailheads. Residential and commercial developments will increase demands for ROWs, land use permits, small-scale direct sales, and communication sites. Road improvements would require increased mineral materials sites. Under current management, the Upper Snake FO expects impacts on cultural resources located in areas open to unrestricted cross-country motorized travel. Increased river-based recreation would also threaten cultural resources located along the Snake River and its major tributaries. The Upper Snake FO would continue a fuels management and vegetation treatment program. Some treatments are related to emergency fire stabilization projects. Other treatment projects are designed to reduce the size and intensity of wildfires and control invasive species/noxious weeds. Vegetative treatments can directly affect cultural resource sites and expose them to looting while sites are marked for avoidance.

Limiting activities that contribute to site degradation would diminish effects to eligible sites but would also curtail some individual's recreational and transportation pursuits in the FOA. Activities that would be restricted from locations of eligible cultural resources on a case-by-case basis may include, but not be limited to, use of mechanized vehicles, surface occupancy for mineral exploration and development, rock climbing, horseback riding, dispersed camping, target shooting, and livestock grazing. Methods used for restricting depreciatory activities will include posting signs and fencing cultural resource areas. Limiting activities within the boundaries of eligible cultural resources would conserve the integrity of those resources for years, and possibly decades, to come. Without management intervention, deterioration and attrition to eligible cultural resource sites would continue from natural and human induced threats.

In addition, the lands and resources managed by the Upper Snake FO are an important part of the Shoshone–Bannock Tribes' history, cultural, and sense of place. Cultural resource management direction needs to consider and implement specific tribal goals and objectives to ensure that future generations of tribal members have the same unique opportunities to enjoy the natural landscape, gather resources, and continue traditional cultural and subsistence practices.

2.15.3. Trends

The condition and trend of cultural resources in the FOA varies considerably as a result of the diversity of terrain, geomorphology, access and visibility, and past and current land use patterns. Recorded sites are usually identified by exposed artifacts, features, and/or structures. They are easily disturbed by elements such as wind and water erosion, animal and human intrusion, natural deterioration and decay, and development and maintenance activities. Based on limited site monitoring, and site form documentation, the trend of site conditions in the FOA is considered to be downward. Active vandalism or collecting (e.g., unauthorized digging, unauthorized surface collection, and use of metal detectors) has been documented. Impacts caused by development and maintenance activities (e.g., grazing, mining, and recreation) are known to be affecting sites. Stream bank erosion has severely damaged a few sites located along major creeks and rivers. The natural deterioration and decay of wooden and rock structures recorded at historic mining and homesteading sites is a continuing concern. Collectively, these agents have adversely affected and continue to adversely affect many known cultural resources.

Within the FOA, the demand for cultural resources is increasing as the regional and national significance of the cultural resources is being recognized. This determination is based on the known research interests of scholars and other professionals; interest expressed by members of the Native American and local communities, and documented site conditions. Cultural resources condition and trend within the planning area varies considerably as a result of terrain variability and geomorphology, access and visibility, and past and current land use. Wind and water erosion, animal activity, human intrusion, vehicle traffic, vegetation treatment activities, development projects, and facilities maintenance can disturb artifacts and features exposed on the ground surface. Based on limited site visitation and site form documentation, the trend of site condition is considered stable in most areas. Vandalism and unauthorized collection at sites constitutes the main source of cultural resource degradation.

Since the Upper Snake FO approved its current land management plans, several broad changes have occurred that affect cultural resource site conditions. Some changes are beneficial and some are not. Less land is leaving public ownership. Past management emphasis resulted in the disposal of large blocks of public land with only cursory consideration (by current standards) of cultural resource values. The BLM designs pipelines, fences, and roads to avoid direct affects on cultural resources; however, these improvements can provide access to formerly remote areas and expose previously undisturbed sites to artifact theft, vandalism, or inadvertent ground disturbance. Fenced or enclosed springs gap fences along streams may directly benefit cultural resources by restricting livestock access and allowing vegetation to re-establish and flourish. This condition protects soils and associated archaeological deposits.

Looting (illegal digging and retrieval) of archaeological sites appears less prevalent than it was in past decades. Upper Snake FO staff has reported fewer than five episodes of looting within the last 10 years. Effective public outreach efforts and successful law enforcement measures may be responsible for this trend. Rock art site inventories have not documented any significant increase in damage or defacement of

pictograph and petroglyph sites. The Upper Snake FO currently describes the condition of rock art sites on public lands as stable. However, looting and vandalism remain a major cultural resource management concern.

2.15.4. Forecast

Steady population growth in southeastern Idaho would increase demands on public land resources within the planning area, including cultural resources. Under current management, adverse effects to cultural resources located in areas open to unrestricted cross-country motorized travel are anticipated to increase. As more people engage in river-based recreation, threats to cultural resources in stream-side settings are expected to increase. Proposed energy corridors and local area energy-related development pose threats to cultural resources, particularly historic trails.

Other changes and trends in public land uses such as the growth in motorized OHV use and river-based recreation, and improved access may offset the positive effects of the changes previously noted. Planned power line corridors also pose a threat to cultural resources. It may not be possible to mitigate all the anticipated affects that these large projects would visit upon cultural resources.

Wildfires in the FOA continue to impact cultural resources, primarily through the effects of heat on artifacts and structures, but also by suppression activities and through post-fire wind erosion related to the lack of soil-stabilizing plants. Wildfires have increased undesirable effects to critical visual corridors along historic trails over the past 20 years, including the replacement of native vegetation with annual grasses and weeds and/or crested wheatgrass. On the positive side, archaeological inventories for fire stabilization and rehabilitation projects have greatly increased the knowledge base of aboriginal and Euro–American land use in the FOA.

An increasing demand for cultural resource use could affect the future condition of cultural resources found in the FOA. This demand is related to recent recognition of the regional and national significance of southern Idaho's cultural resources. Professional archaeologists within and outside of Idaho are looking at the FOA as a source of future archaeological research projects and field school locations. The designation of Heritage Tourist and Geo Tourism areas in an around the FOA is also increasing demand for access to cultural resource sites and historic trails.

There is also interest and support for designating additional national historical trails in the FOA. The Shoshone–Bannock Tribes have indicated interest in establishing the Bannock Trail as a National Historical Trail. The Upper Snake FO would consider this action in future recreation and cultural resource management decisions. The FO would work with closely with the Shoshone–Bannock Tribes and follow National Scenic and Historic Trails (NSHT) guidelines to designate a route and corridor for the Bannock National Historic Trail as appropriate.

2.15.5. Key Features

Cultural resources are distributed in a non-random pattern throughout the FOA. Water sources were key terrain features for both native peoples and Euro–Americans. Archaeological site density is normally greatest near live streams and major intermittent streams, along playa shorelines, and at spring sites. Other natural attractions include valley floors, caves, and rockshelters, tool stone sources, basalt lava flow margins, buttes, craters, dunes, mountain summits and ridges. Studies of site distribution on the INL

portion of the Snake River Plain (Ringe 1995, Reed et al. 1987) imply that prehistoric population movements targeted landforms that indicated specific natural resources. One study associates prehistoric human activity with specific topography. In addition to previously listed key features, the study identified the Big Lost River, Birch Creek, Lost River Sinks, Lemhi Mountains, and the Lake Terreton basin (Ringe 1995). Other key terrain features in the planning area are the Yellowstone Plateau, Henry's Lake, St. Anthony Sand Dunes, Egin Lakes, Snake River, and the Henry's and South Forks of the Snake River. One unique key feature is the Box Canyon of the Big Lost River. This narrow canyon was created by the Big Lost River cutting a deep channel through a basalt lava flow. The canyon appears suddenly on the Snake River Plain between Arco, Idaho, and the west boundary of the INL. It features prehistoric campsites; bison kill sites, and rock art panels.

Key historic features of the cultural landscape include remnants of the Jeffrey–Goodale Cutoff, McTucker Road, Corrine–Bannack Road, Utah and Northern Railroad, Oregon Short Line (Union Pacific Railroad), and associated sites (**Figure A-13, Appendix A–Maps**). Cabins, mine shafts, adits, ore loaders and CCC rock walls are also key features. The NPNHT and Bannock Trail may lack a physical track or trace, but trail routes and sites associated with these trails are also key features in the Upper Snake PA.

2.16. Tribal Treaty Rights and Interests

The United States has a unique legal relationship with Native American Tribal governments as established in the Constitution of the United States, treaties, statutes, EOs, and court decisions. Since its founding, the United States has recognized Native American Tribes as domestic dependent nations under its protection. The Federal Government has enacted numerous regulations and policies that establish and define a trust relationship with Indian Tribes.

Native American tribes with interest in the PA are the Shoshone–Bannock Tribes. As shown in **Table 2-1**, approximately 83 acres of the Shoshone–Bannock Tribes' Fort Hall Indian Reservation is located within the Upper Snake PA. However, the Shoshone–Bannock Tribes retain the right to traditional practices, such as gathering, hunting, and fishing, over a much larger area of public lands granted to them by the United States Government under the Fort Bridger Treaty (USA and Shoshone–Bannock Tribes 1869). The Tribes' members contribute to southeastern Idaho's history, current-day culture, and the local and regional economies.

The Shoshone–Bannock Tribes, as a sovereign nation, have an important interest in the PA and with the land use planning process. The Upper Snake FO continues working with the Shoshone–Bannock Tribes on a government-to-government basis, as stated through EOs 13084 (63 FR 96, 1998) and 13175 (65 FR 218, 2000) and Section 106 of the NHPA, which requires federal agencies to consult with tribes for activities authorized on public lands and for historic properties of significance to the tribes that may be affected by an undertaking.

2.16.1. Treaty-based Subsistence Use

Various unratified treaties were negotiated and signed between the numerous bands of Shoshone and Bannock and the United States. The Fort Bridger Treaty of July 3, 1868, was the only treaty ratified by Congress (February 26, 1869) between the Eastern Shoshone bands and the Bannocks (USA and Shoshone–Bannock Tribes 1868). In 1867, the Fort Hall Indian Reservation was established as the permanent homeland of the Shoshone and Bannock peoples. The 1868 Fort Bridger Treaty (15 Stat 73) affirmed the reservation and reserved certain off-reservation hunting and gathering rights for the Tribes. Article IV states:

> *"The Indians herein named agree, when the agency-hause and other buildings shall be constructed on their reservations named, they will make said reservations their permanent home, and they will make no permanent settlement elsewhere; but they shall have the right to hunt on the unoccupied land of the United States so long as game may be found thereon, and so long as peace subsists among the whites and Indians on the borders of the hunting districts." (USA and Shoshone–Bannock Tribes 1868)*

2.16.2. Traditional Use Areas

Prior to the ratification of the Fort Bridger Treaty, various bands of the Shoshone, Bannock, and Paiute people roamed extensively throughout the Great Basin and Intermountain region. Prior to non-Indian settlement in the region, Indians utilized abundant natural resources and enjoyed the traditional cultural practices unique to their people. The Tribes called their aboriginal territory, "bia sokoppe," the Shoshone term referring to Mother Earth, or literally, "our big lands."

The Shoshone and Bannock peoples report they have inhabited the upper reaches of the Snake River from time immemorial (Shoshone–Bannock Tribes 2009a). The Snake River plains were rich in resources and formed the basis for a successful subsistence culture. An ethic of "take only what you need" ensured resources would not be over harvested and future generations could enjoy traditional cultural practices. The Shoshone and Bannock peoples hunted bison and other big game in the Birch Creek Valley; Big and Little Lost River drainages; Snake River Plain; the Henry's and South Forks of the Snake River; Warm River; and the Blackfoot River drainage. Botanical resources, small game, and fish were staples of the Shoshone–Bannock peoples' subsistence diet and were commonly found in abundance throughout the PA. This traditional way of living was disrupted by the establishment of the Idaho Territory in 1863, and the subsequent negotiating and signing of treaties that acquired and opened Indian lands in the northwestern U.S. for homesteading and mining.

The PA's peaks, buttes, ridge tops and other landforms provide numerous high points used by native peoples for overlooks and vantage points for hunting, security, scouting, burials, and spiritual purposes. These uses are verified by the presence of petroglyphs, pictographs, rock shelters, rock structures, and physical cultural materials.

The lava flows on the Snake River Plain hold significant value for the Tribes, and the native people were skilled at using the unique desert resources. The Tribes used the geographical landmarks to travel across the desert to the Camas Prairie and Salmon River country. Lava formations were utilized for food storage cache (including ice caves) and shelter during traditional gathering migrations. Basalt rocks from the lava flows and volcanic formations are also gathered for ceremonial purposes, such as providing sweat rocks, and provide sources for obsidian, chert, and other rock types.

Active lava flows within the Snake River Plain was the basis of many tribal stories and legends. This is supported by geological studies of the eastern Snake River Plain. Some cinder cones, flows, and fissures were formed a little over 2,000 years ago (Kunz et al. 1986). The area's rugged, labyrinth-like landscape has also contributed to Tribal oral traditions. For example, stories are told about the U.S. Cavalry chasing the Indians across the desert, but the soldiers were unable to locate them. The Indians "disappeared" into the desert.

Parts of current day trails are located on pre-existing transportation routes used by native people. Indian trails and routes often followed rivers, over passes, and provided access to different regions. For example, the Bannock Trail is an extensive trail system, starting in Oregon, crossing the Snake River Plain, passing through the Camas Prairie area and into the Greater Yellowstone Region. From the north, the Bannock Trail was a thoroughfare across the Rocky Mountains, from the Salmon River Valley, through the Birch Creek Valley, into the Yellowstone area, and onto the buffalo ranges east of the Continental Divide.

Fur trappers, miners, ranchers, and non-Indian settlers occupied the Upper Snake during the early to mid-nineteenth century. These early contacts with the Shoshone and Bannock peoples identified settlements and winter encampments throughout the Upper Snake PA, with large concentrations noted within the Blackfoot and Snake River drainages. Competition for resources by a growing influx of Euro–Americans required the Shoshone and Bannock peoples to travel further for resources that are now absent from the PA.

2.17. Wildland Fire Ecology and Management

2.17.1. Indicators

Around the 1980s, scientists and fire managers started to observe that many fire-prone landscapes were experiencing more frequent and/or severe wildfires. These observations were suspected to be a result of, at least in part, past management activities such as fire exclusion (suppression), timber harvesting, grazing, introduction of invasive species/noxious weeds, and insects and disease. To describe these changes, a Fire Regime Condition Class (FRCC) (Hann and Bunnell 2001) methodology was developed. FRCC can be described as the degree of departure (low, moderate, high) from historic fire regimes for a particular vegetative community.

Figure 1 illustrates how these two types of departure are used to determine FRCC. Departures of 0-to-33% (FRCC 1) are considered within the historical (natural) range of variability and are desirable, meaning that wildland fires that occur would display normal fire frequency-severity because normal vegetation-fuels conditions exist. Departures of 34 to 100% (FRCC 2 or 3, respectively) are considered outside the historical (natural) range of variability and are not desirable. Moving toward, and achieving, FRCC 1 is the most desirable.

This departure results in changes to key ecosystem components such as vegetation characteristics; fuel composition; fire frequency, fire severity and pattern; and other associated disturbances, such as insects and disease mortality. FRCC is used not only to classify existing vegetation fire related conditions but to determine priority areas for possible treatment dependent upon resource values.

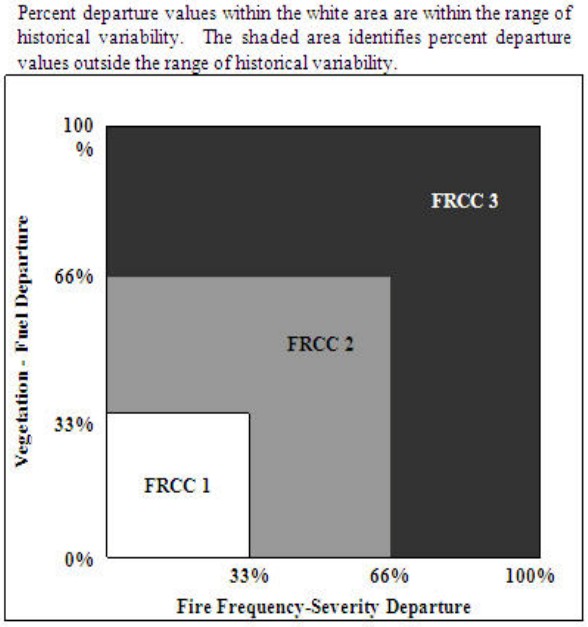

Figure 1. Graphical display of FRCC representing the percent departure from the historical (natural) range of variability for vegetation-fuels and fire frequency-severity.

FRCC can be used to identify both current and desired wildland fire conditions as described and shown in **Table 2-27**. Fire regimes are important in understanding the FRCC methodology and describe fire frequency (average number of years between fires) and severity (effect of fire on the dominant overstory vegetation: low, mixed, or stand replacement). A natural fire regime is a general classification of the role fire would play across a landscape in absence of modern human mechanical intervention but including the influence of traditional burning.[6] The five, historical (natural) fire regimes (HFRs) are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. Natural fire regimes and acres for each regime within the Upper Snake FOA are described in **Table 2-28**.

[6] Traditional burning refers to burning done by native peoples as part of their culture i.e., hunting practices.

Table 2-27. FRCCs within the Upper Snake FOA.

FRCC	Condition Class Description	Acres of planning area in FRCC (%)
1	Fire regimes are within historic timeframes, and the loss of key ecosystem components from the occurrence of fire is low. Areas are considered to be healthy and functioning adequately.	217,157 (12)
2	Fire regimes have been moderately altered from their historic timeframes by either increased or decreased fire frequency and are at moderate risk of losing key ecosystem components. Areas are considered to be unhealthy, and their rate of deterioration is expected to increase moderately to rapidly.	1,266,748 (70)
3	Fire regimes have been significantly altered from their historic timeframes, and the loss of key ecosystem components is high. Areas are considered to be unhealthy and nonfunctioning.	325,735 (18)

Table 2-28. Natural fire regimes in the Upper Snake PA.

Fire Regime	Frequency (years)	Severity	Area in Fire Regime Class	
			Acres	%
I	0–35	Low and Mixed	29,304	2
II	0–35	Replacement	0	0
III	35–100	Mixed	316,887	17
IV	35–100	Replacement	1,117,339	62
V	200+	All	21,494	1
Other[a]	–	–	324,616	18

a. Other includes areas with features that infrequently burn e.g., cliffs, canyons, volcanic rock and cinder land, dunes.

However, FRCC is not an appropriate indicator for the wildland–urban interface (WUI) as WUI areas may be maintained in an altered vegetative state to protect life and property. The Idaho Interagency Assessment of Wildland Fire Risk to Communities Working Paper (IDL et al. 2007) has maps of the communities most at risk from wildland fire in Idaho. Relative risk ratings are assigned using HUCs, with rating categories of low, low–moderate, moderate, moderate–high, and high.

Wildland fire management within the Upper Snake FOA incorporates goals and objectives from resources and resource uses that determine how wildfire is integrated into resource management decisions. These goals and objectives and the current management considerations associated with air quality, watershed health, vegetation, special status species, fish and wildlife, and cultural resources, as well as such resource uses as grazing, and forestry and woodland products, all result in a variety of management considerations associated with wildland fire management.

Additional indicators may include watershed health considerations associated with acres of key components (e.g., soil, water, vegetation) affected by wildland fire, acres of vegetation lost or modified by wildland fire, acres of invasive species/noxious weeds, acres of special status species habitat lost or modified, acres of fish and wildlife habitat lost or modified, loss of cultural resource sites and modification of traditional use areas, and acres of biomass available to support healthy forest conditions.

2.17.2. Current Condition

Fire and Fire History

Prior to modern fire suppression, wildland fire had consistently been an integral part of ecosystems across the PA, as demonstrated by historical ecological evidence. To withstand this threat, numerous vegetation species have developed various responses enabling them to resist, tolerate, or take advantage of fire.

At present, many of the vegetation types within the PA have been subjected to wildland fire that is not within historical fire conditions. Large and/or uncharacteristic fires in these vegetation types can threaten people and property as well as the resiliency, integrity, and long-term sustainability of ecosystem components and processes. Fires are occurring more frequently and are burning more severely in some vegetation types. For example, the invasion of the low and Wyoming basin vegetation types by invasive annual species such as cheatgrass has substantially increased fine fuel continuity, making it more susceptible to large, frequent, and uncharacteristic fires. In other vegetation types (e.g., evergreen forest) fires are occurring less frequently than they have historically, which causes undesirable changes in vegetation species composition, structure, and an accumulation of hazardous fuels. For example, because of long-term fire suppression, juniper species are expanding their range at the expense of the low sagebrush vegetation types, and evergreen forest vegetation types are slowly replacing aspen and some mountain sagebrush vegetation types.

Since approximately 1996, and as shown in **Figure 2**, wildland fires have occurred in the PA resulting in an overall increase in acres burned per year as a result of vegetation changes like cheatgrass invasion into the low and Wyoming basin sagebrush vegetation types. To a lesser extent, the FOA has experienced decreases in fire frequency and increases in fire severity in the evergreen forest and mountain sagebrush vegetation types. These vegetation types require more frequent disturbance to decrease fuel loads, facilitate aspen and forb regeneration, and decrease fire intensity. It is clear that hazardous fuel conditions need to be managed. Altered fire regimes (i.e., changes in fire frequency, severity, and size) not only threaten resources such as wildlife habitat, cultural resources, air and visual quality, and water quality but also affect public and firefighter safety within and around areas of human development.

Altered wildfire regimes are believed to be the single most important influence on loss of low and Wyoming sagebrush vegetation types and habitat available to fish and wildlife and special status species (e.g., sage-grouse) in the Upper Snake FOA. Most species of sagebrush are killed by fire, and repeated wildfires, fueled by the encroachment by other vegetation communities (e.g., juniper), cheatgrass and other invasive species, alter vast acres of the low and Wyoming basin sagebrush cover types in the FOA. The occurrence of cheatgrass has altered fire frequency from historic intervals of 35–100 years (Fire Regime IV) to shorter cycles of 5 years or less (Fire Regime II-0).

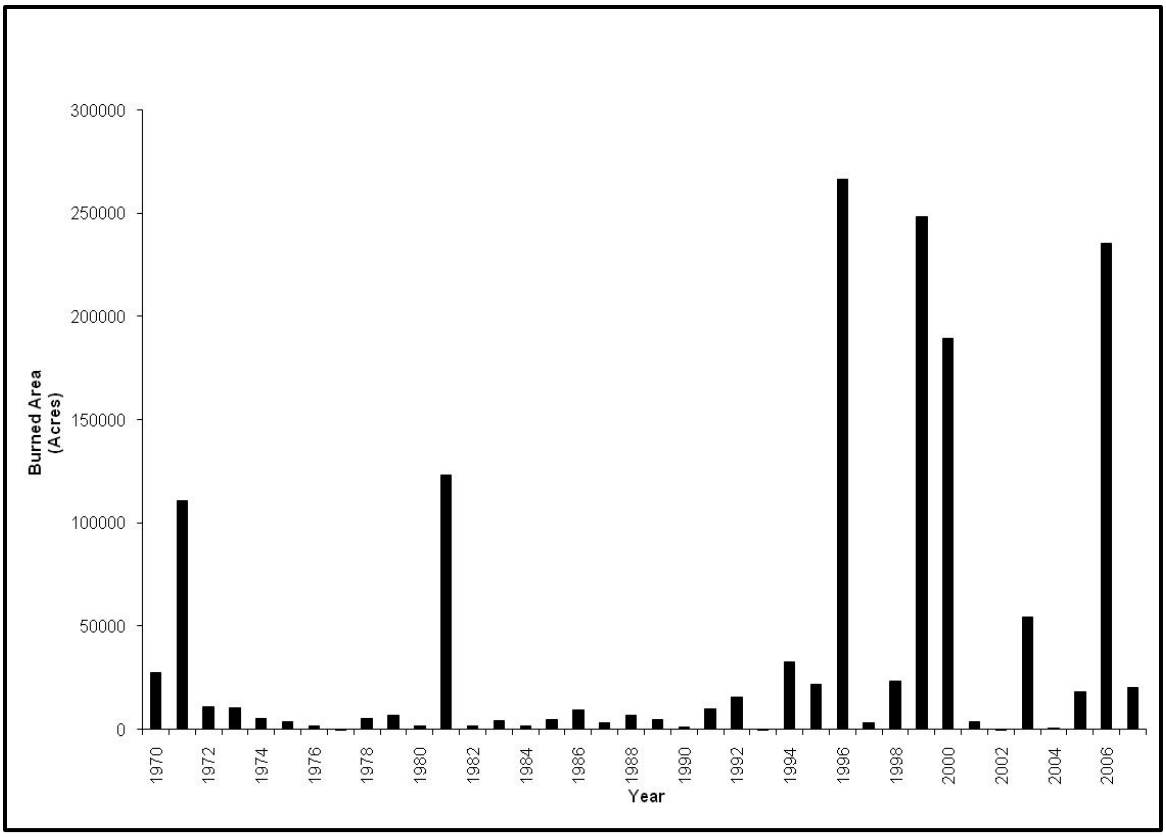

Figure 2. Wildland fire activity in the FOA, 1970 through 2007.

Fire

On BLM-administered public lands, between 1984 and 2008, 636 fires have burned approximately 836,576 acres as shown in **Table 2-29**. Thirty-six percent of these fires were lightning caused fires, while human caused fires accounted for 64%. The average fire size for this period has been about 1,100 acres. It is interesting to note that the majority of fires were human caused fires and occurred predominantly near travel corridors, agriculture perimeters, or in areas where warming fires were used. Fire size classes A and B accounted for 59% of these fires, class C accounted for 19% and classes D, E, F, and G overall account for less than 20%.

Suppression

An appropriate management response (AMR) suppression strategy is used on all wildland fires in accordance with management objectives and based on current conditions and fire location. Every wildland fire is assigned an AMR to protect firefighters, the public, and values at risk and to minimize suppression costs. The protection of human life is the single overriding priority, with other priorities such as communities, property and improvements, natural and cultural resource values, human health and safety, and the costs of suppression. AMR can vary from aggressive initial action to monitoring.

Wildland fire use (WFU) is a pre-planned naturally ignited fire designed to meet specific resource objectives and conducted within defined burn parameters and weather conditions.

As shown in **Figure A-14, in Appendix A–Maps**, approximately 501,700 acres in the Upper Snake FOA have been identified as suitable for WFU for resource benefit, and approximately 1.3M acres are not appropriate because of ecological, social, economic, political, and resource constraints. Areas designated as suitable for WFU are limited to vegetation types that have degraded because of too little fire, shifts in species dominance, and accumulation of fuels. These vegetation types include the mixed evergreen deciduous forest, Wyoming basin sagebrush, evergreen woodland, mountain sagebrush, and evergreen forest.

Table 2-29. Wildland fire history for the period 1984 through 2008 for the FOA.

Size Class	Fire Starts Acres Burned	No. Fire Starts
A (0–0.2)	10	90
B (0.3–9.9)	584	285
C (10–99.9)	4,604	118
D (100–299.9)	10,143	61
E (300–999.9)	16,290	33
F (1,000–4,999.9)	56,935	29
G (5,000+)	748,010	20
Total	836,576	636

Emergency Stabilization and Rehabilitation

The extent of the activities of Upper Snake FO emergency stabilization and rehabilitation (ES&R) program is dependent upon the severity of the wildfire season. Emergency stabilization is defined as

> *"…planned actions to stabilize and prevent unacceptable degradation to natural and cultural resources, to minimize threats to life and property resulting from the effects of a fire, or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources."* (BLM 2007a)

These actions must be taken within 1 year following containment of a wildland fire. The objective of emergency stabilization is

> *"…to determine the need for and to prescribe and implement emergency treatments to minimize threats to life or property or to stabilize and prevent unacceptable degradation to natural and cultural resources resulting from the effects of a fire."* (BLM 2007a)

Rehabilitation is defined as

> *"…efforts undertaken within 3 years of containment of a wildland fire to repair or improve fire-damaged lands unlikely to recover naturally to management approved conditions, or to repair or replace minor facilities damaged by fire."* (BLM 2007a)

The objectives of rehabilitation are to (1) evaluate actual and potential long-term post-fire impacts to critical cultural and natural resources and identify those areas unlikely to recover naturally from severe wildland fire damage; (2) develop and implement cost-effective plans to emulate historical or pre-fire ecosystems consistent with approved land management plans, or, if that is not feasible, to restore or establish a healthy, stable ecosystem in which native species are well represented; and (3) repair or replace minor facilities damaged by wildland fire (BLM 2007a).

Restoration is the continuation of post-fire rehabilitation beyond the initial 3 years following a wildfire and is outside the scope of the ES&R program (BLM 2007a). One of the goals of restoration is to improve FRCC (i.e., trend toward FRCC 1) and facilitate a return of fire to a natural role within the ecosystem.

Vegetation Types and FRCC

Vegetation on the FOA is predominantly semi-desert shrubland and grassland vegetation (87%), mesic shrubland (< 1%), forest (2%), mesic grassland (< 1%), woodland (1%), and sparse vegetation (10%), with water and urban areas comprising the balance of the landscape. **Table 2-30** lists the vegetation ecological systems found within the FOA described in **Section 2.8**, Vegetation—Upland Vegetation and Habitats and shown in **Figure A-6, Appendix A–Maps**.

Table 2-30. Upper Snake FOA vegetation ecological systems.

Ecological Systems	Acres	Historical Fire Regime	FRCC
Forest[a]	**30,436**		
Middle Rocky Mountain Montane Douglas-fir Forest and Woodland	15,421	I	3
Rocky Mountain Lodgepole Pine Forest	1,132	IV	3
Rocky Mountain Subalpine Dry–Mesic Spruce-Fir Forest and Woodland	9,466	I	2
Inter-mountain Basins Aspen–Mixed Conifer Forest and Woodland	4,417	I	2
Mesic Grassland	**4,080**		
Inter-mountain Basins Alkaline Closed Depression	2,004	IV	3
Rocky Mountain Alpine–Montane Wet Meadow	2,076	IV	3
Semi-Desert Shrubland	**1,109,700**		
Inter-mountain Basins Mixed Salt Desert Shrub	19,655	V	1
Great Basin Xeric Mixed Sagebrush Shrubland	290,819	III	3
Inter-mountain Basins Big Sage Steppe	582,071	IV	2
Inter-mountain Basins Greasewood Flats	1,839	V	1
Inter-mountain Basins Montane Sagebrush Steppe	210,469	IV	2
Inter-mountain Basins Curl-leaf Mountain Mahogany	4,847	III	3
Semi-Dessert Grassland	**459,879**		
Semi-desert Non-native Perennial Grassland	136,886	–	2
Semi-desert Non-native Annual Grassland	2,088	–	2
Semi-desert Native Perennial Grassland	280,852	IV	2
Great Basin Xeric Mixed Sagebrush Shrubland	6,804	III	3
Inter-mountain Basins Montane Sagebrush Steppe	33,249	IV	2

Ecological Systems	Acres	Historical Fire Regime	FRCC
Mesic Shrubland	**3,174**		
Rocky Mountain Subalpine-Montane Riparian Shrubland	3,174	IV	3
Woodland	**18,458**		
Rocky Mountain Lower Montane-Foothill Riparian	3,538	IV	3
Inter-mountain Basins Juniper Savanna	14,417	III	2
Rocky Mountain Subalpine–Montane Limber-Bristlecone Pine	503	IV	2
Sparse Vegetation and Natural Barren Areas	**180,782**		
Inter-mountain Basins Active and Stabilized Dune	21,345	–	–
Inter-mountain Basins Cliff and Canyon	18,245	–	–
Inter-mountain Basins Volcanic Rock and Cinder Land	141,192	–	–
Urban and Other Undeveloped Lands	**587**		
Urban/Industrial/Excavation Areas	587	–	–
Open Water	**2,544**		
Water	2,544	–	–

a. Shaded rows are vegetation formations, as defined by the National Vegetation Classification Standard (Federal Geographic Data Committee 2008).

As previously discussed in **Section 2.8,** Vegetation—Upland Vegetation and Habitats, the NVCS types for the PA were combined into 10 vegetation types. Across the Upper Snake FOA, FRCC for the ten vegetation types is found to range from FRCC 1 to 3. Specifically, the salt desert shrub is currently in FRCC 1 with low departure from historical fire conditions. The mountain sagebrush, evergreen woodland, and mixed evergreen deciduous forest vegetation types are in FRCC 2 showing moderate departure from historical fire conditions, and the low sagebrush, Wyoming basin sagebrush, mountain mahogany evergreen forest are in FRCC 3 with high departure from historical fire conditions. The riparian–wetlands and vegetated rock vegetation types exhibit FRCC similar to those vetation types to which they are adjacent to, or found within.

Fuels and Vegetation Treatments

The Upper Snake FOA comprises a wide variety of landscapes, topographies, vegetation types, and habitats. At the extremes, forest/timber types are concentrated on the north and east side and the sagebrush steppe is present throughout the Snake River Plain, within valleys and along foothills. Past use and wildfire histories have influenced the present state of the vegetation, its condition, ecology, and management priorities.

The Upper Snake FO fuels management and vegetation treatment program involves ES&R and other vegetation treatment projects designed to reduce the size and intensity of wildfires and control invasive species/noxious weeds. Methods for vegetation treatment include WFU; biological (e.g., insects, grazing), mechanical and chemical treatment; prescribed fire; and seeding. In the FOA, approximately

136,886 acres were treated using these methods. These treatments were completed for fuels reduction in WUI and non-WUI areas, to address range/wildlife habitat needs, for ES&R, and as directed under the Healthy Lands Initiative (HLI), Healthy Forest Restoration Act (HFRA, 16 U.S.C. 84 § 6501 et seq.).

The primary focuses of current management for the Upper Snake FOA include the WUI, and maintaining or improving the sagebrush steppe in the Big Desert area by means of fire rehabilitation and hazardous fuels reduction projects focused on restoration. The dominance of highly flammable annual cheatgrass and perennial grasses in the Big Desert area is a consequence of past, large fires that have decimated the shrub canopy. In the Wyoming basin sagebrush vegetation type (e.g., north of the Camas National Wildlife Refuge and St. Anthony Sand Dunes areas), prescribed fire and mechanical treatments remain priorities to reduce hazardous fuels and restore ecological health. Remaining priorities involve projects in mountain sagebrush and mountain mahogany, mixed evergreen deciduous forest, and evergreen forest vegetation types to stimulate desirable species and to reduce hazardous fuels.

WUI and Communities-at-Risk

WUI areas have been identified as the human population begins to expand. A community-at-risk (CAR) is defined as locales where people live and work that are located within or adjacent to WUIs and where there is potential for detrimental effects to public health and safety, loss of life and property, and/or economic infrastructure as a result of wildfire. CARs within the PA were identified in the *Federal Register* on August 17, 2001 (66 FR 160, 2001) and are shown in **Figure A-15, Appendix A–Maps.** BLM's wildland fire response and management with regard to CARs and WUIs are handled in accordance with the BLM fire management plan and county wildfire protection plans (CWPPs). All of the CWPPs have been completed within the PA. These plans were completed on an interagency basis with participation by BLM.

The BLM works with local rural fire departments to reduce the risk of wildland fire in communities, thereby protecting homes and adjacent public lands. The BLM provides wildland firefighter training and assistance with CWPP development. BLM personnel provide public education through programs including Smokey Bear and fire education programs in schools, Fire Wise programs, and open houses focusing on fire education, fire-safe homes, and WUI community awareness.

2.17.3. Trends

Based upon current conditions previously described for the vegetation types, a major portion of the Upper Snake FOA is in FRCC 2 and 3 (88%), which shows a moderate to high departure from historical natural fire conditions.

Without special attention and implementing management direction to slow and change this trend, these public lands will continue to shift further from FRCC 1. This trend can be attributed to past land management activities; conversion of lands for agriculture; conversion of public lands to seeded ranges with non-native species; successful suppression of wildland fires for the past 50 years, at least, allowing for accumulation of hazardous fuels; insect and disease outbreaks; the expansion of invasive species/noxious weeds; and the expansion of WUI areas.

Since 1996, wildland fires within the FOA have increased the acres burned and intensity/severity resulting in the loss of property, damage to natural and biological resources, and the disruption of

community services. The PA has a high potential for damage by wildland fires in WUI areas. Such fires continue to burn with greater intensity/severity and can exceed the fire suppression capabilities of fire-fighters.

The primary vegetation/fire ecology trends for the major ecological systems as described in **Table 2-30** are briefly summarized below.

Semi-desert Shrubland and Semi-desert Grassland
Within the PA, the semi-desert shrubland and semi-desert grassland ecological systems have decreased from its historical area through conversion to agriculture, seeded ranges (e.g., crested wheatgrass), and more recently, from the invasion by cheatgrass resulting in altered fire regimes. In addition, juniper encroachment continues as a result of fire suppression activities. Following wildland fire, ES&R activities have contributed to changing species composition in attempts to reduce the establishment and expansion of invasive species/noxious weeds and providing cover to reduce soil erosion. The continued loss of these cover types is a major concern as it provides important habitat for wildlife, special status species, and sagebrush obligate species such as the greater sage-grouse. The occurrence of wildland fire in these cover types has increased in frequency and severity compared to historical fire conditions.

Forest, Woodland, Mesic Shrubland
In general, successful fire suppression efforts in the forest, woodland, and mesic shrubland ecological systems have resulted in increased stand densities and trend toward a greater representation of late seral/climax vegetation. This in turn, has resulted in a corresponding loss of early- and mid-seral stages that provide important habitat for associated wildlife and special status species. Current fire regimes in the forest and woodland systems are less frequent and less severe than historical fire conditions. For the mesic shrubland current fire regimes remain about the same as historical fire conditions.

2.17.4. Forecast

The Upper Snake FO continues to implement fire, fuels and related vegetation treatments based upon management direction resulting from the ROD for the FMDA (BLM 2008b). This approach will allow the FO to continue to move toward resource conditions that minimize risk to human life and property; allow for efficient and effective wildland fire suppression efforts; integrate fire's natural role into resource management decisions; maintain or restore vegetation that supports special status species and healthy, diverse, and sustainable vegetation communities; and provide for other uses by managing vegetative conditions to achieve desired conditions.

However, some literature challenges the ability to return areas converted to non-native annual grasses to the original natural vegetation as a result of long-term climate change and the passing of a physical or biotic threshold that will not allow transition back to the previous state (Roundy et al. 2006, West 1993).

The results of implementing the ROD for FMDA will take time (years) to be realized and may require adjustments in the number of public land acres treated as well as the treatment methods used. The unpredictable nature of wildland fire and its occurrence, as well as drought, potential climate change, and past management activities can influence management actions to improve vegetation conditions and FRCC. With current management direction and resulting actions, it is expected that fire can be integrated into resource management decisions and used as a tool resembling its natural role in the ecosystem.

WUI issues are expected to increase as the population base and interest in use of the public lands continues to grow. While the majority of the Upper Snake FOA is far removed from private land, it is currently used by members of the public for hunting, fishing, recreation, and other authorized and permitted uses. Ensuring the public understands the importance of public lands, native vegetation, and the role fire plays in management decisions and ecosystem management will be crucial in reducing wildland fires and conflicts among resources and resource uses.

2.17.5. Key Features

The low, mountain and Wyoming basin sagebrush vegetation types are an important key feature with regards to wildland fire management. These vegetation types make up approximately 85% of the entire FOA, provide habitat for many wildlife and special status species, and have exhibited the greatest changes over time as a result of wildland fires.

Other areas of importance include the increasing WUI area found adjacent to public lands and communities.

2.18. Visual Resources

2.18.1. Indicators

The Upper Snake FO is entrusted with the care of the FOA's outstanding scenic landscapes and for ensuring that scenic values are considered before allowing uses that may have negative visual impacts. The BLM's VRM system is a tool to identify and evaluate scenic values to determine the appropriate levels of management. Because it is neither desirable nor practical to provide the same level of management for all visual resources, it is necessary to systematically identify and evaluate these values to determine the appropriate level of management.

The BLM VRM system consists of inventorying visual resources (after a baseline inventory is developed, this is an ongoing process), determining the appropriate level of management by establishing visual resource management objectives (this step is completed during the RMP development process), and (after an approved RMP is in place) evaluating specific future management projects for conformance to the approved managment objectives.

The inventory stage involves identifying the visual resources of an area and assigning them to inventory classes using BLM's visual resource inventory process. The process involves rating the visual appeal of a tract of public land, measuring public concern for scenic quality, and determining whether or not the tract of public land is visible from travel routes or observation points. The process is described in detail in BLM Handbook H-8410-1, Visual Resource Inventory (BLM 1986a). During the RMP development process, the area's visual resources are assigned to management classes (shown on **Figure A-16**, **Appendix A–Maps**) with established objectives, as follows:

- Class I: To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention. Class I provides for natural ecological changes; however, it does not preclude very limited management activity.
- Class II: To retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the landscape.
- Class III: To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer.
- Class IV: To provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be a major focus of the viewer's attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating basic elements of form, line, color, and texture found in the predominant natural features of the landscape.

The VRM system also provides objectivity in determining whether potential visual impacts from proposed surface-disturbing activities or developments will meet the management objectives established for the area, or whether design adjustments will be required. A visual contrast rating process is used for this analysis, which involves comparing the project features with the major features in the existing landscape using the basic design elements of form, line, color, and texture. This process is described in

detail in BLM Handbook H-8431-1, Visual Resource Contrast Rating (BLM 1986b). The analysis can then be used as a guide for resolving visual impacts. Once every attempt is made to reduce visual impacts, BLM managers can decide whether to accept or deny project proposals. Managers also have the option of attaching additional mitigation stipulations to bring the proposal into compliance.

2.18.2. Current Conditions

The original VRM inventory classes were identified in the current LUPs (i.e., the three MFPs and one RMP). As inventory and assessment techniques improved, the visual resource inventory for the Upper Snake FOA was updated in 1994 and coincided with the development of the Interior Columbia Basin Ecosystem Management Project (1997). The 1994 inventory was undertaken to evaluate the visual characteristics of land, water surface, vegetation, and structures, which provided the subsequent delineation of scenic quality, sensitivity to changes in the visual landscape, and distance zones. The 1994 inventory, and subsequent VRM class designations, reflected the best effort to update and more accurately quantify the original VRM classes assessed for the LUPs. The best available VRM class data currently available is based upon the MFPs, RMP, and the 1994 inventory. As of spring 2009, a new inventory effort is underway and the results of the inventory will be indentified and analyzed in the alternatives developed for the Upper Snake RMP planning process. At this time, **Table 2-31** presents the best available estimate of the current VRM inventory classes for the Upper Snake FOA. Class descriptions follow the table.

Table 2-31. VRM inventory classes and acreages for the Upper Snake FOA.

Land Use Plan		Class I (acres)	Class II (acres)	Class III (acres)	Class IV (acres)
Big Desert MFP		104,065	40,402	505,788	–
Big Lost MFP		35,686	19,265	79,919	27,312
Little Lost MFP		25,265	5,940	310,860	–
Medicine Lodge RMP	Snake River Islands	873	380,318	234,129	18,207
	Sand Mountain	21,743			
	Henry's Lake	348			
Class Totals		187,980	445,925	1,130,696	45,519

VRM Class I

The VRM Class I areas are all 11 of the WSAs in the Upper Snake FOA. The VRM Class I designation is temporarily assigned to all WSAs pending Congress' consideration of the WSAs as wilderness areas (see **Section 2.27.2**, for more information on the WSA/wilderness area process). If the WSAs are formally designated as wilderness, they will remain as VRM Class I. If the WSAs are released by Congress from wilderness designation, the areas will be managed consistent with the surrounding VRM Class.

VRM Class II
VRM Class II areas include most of the South Fork, Henry's Fork, and Main Snake River system; North Menan Butte; Victor, Idaho, watershed; sand dunes northwest of St. Anthony, Idaho; Medicine Lodge Creek; the Idaho side of the Monida Pass; Willow and Gray's Creek canyons; Big Southern Butte and the Table Butte areas as well as BLM-administered public lands adjacent to NFSL.

VRM Class III
The VRM Class III areas are found in the Snake River Plain west of Blackfoot and the watersheds of the Little Lost and Birch Creek drainages.

VRM Class IV
The VRM Class IV areas are found among the isolated public land parcels in the cultivated valleys of the Big and lower Little Lost River drainages as well as south of the Nine Mile Knoll and Campbell Gulch areas. These areas have existing landscape modifications by man that are evident.

2.18.3. Trends

Public lands in the Upper Snake FOA are intermingled with numerous communities in eastern Idaho. The landscape is experiencing a high degree of human modification (e.g., infrastructure development) as a result of population growth and urban development in communities adjacent to public lands. Alternative energy development is also modifying the landscape on public lands and adjacent private lands. Anticipated future recreation, urban development, and commercial growth will increase the need for additional staff and budget funding to address concerns to visual resources.

Public lands may also have inconsistent VRM classifications. This allows major surface-disturbing activities to occur in or adjacent to areas where the level of change to the characteristic landscape may be conflicting. Adverse impacts to scenic vistas and natural settings could continue to increase throughout the PA due to management of multiple resources on public lands and activities occurring on adjacent private lands. Growing pressure is being placed on the visual resources as a result of activities such as fire management, recreation management, land use authorizations (e.g., utility corridors, communication sites, road and trail development for authorizations), and livestock grazing management (e.g., pipelines, roads for herding and trailing livestock, and water tanks). These activities could adversely affect scenic values; locations that are currently pristine and untouched could eventually be crisscrossed with developments such as OHV trails, roads and utility corridors. Community assessments of adjacent communities to public lands conducted in May 2008 identified a public concern with the preservation of visual and scenic quality for open space and scenic backgrounds in residential areas and for recreational uses. Upper Snake FO staff are assessing the current condition of visual resources adjacent to local communities or population centers, major transportation and utility corridors, and other scenic viewsheds to answer how BLM should manage these sensitive viewsheds and corridors.

2.18.4. Forecast

Assuming increasing commercial development and recreation use, greater long-term visual impacts will occur. Changes in recreation use, resource conflicts, and population growth/urban interface will trigger the need to review the existing VRM classes and make any changes to protect sensitive visual resource values.

2.18.5. Key Features

Key features include areas of high public use and visibility areas, such as along the South Fork and at the St. Anthony Sand Dunes. Other key feature areas include the main stem of the Snake River, the Henry's Fork of the Snake River, Teton River, unique land forms (i.e., Big Southern Butte and Menan Butte), and WSAs.

2.19. Wilderness Characteristics

2.19.1. Indicators

Wilderness character conditions tend to be more qualitative in nature, measuring the overall landscape and naturalness of an area as a result of changes to levels of recreational activities, development, and surrounding land use trends. Indicators that can quantitatively be measured include changes to route designations, including the number of unauthorized trails, the number of encounters with other users, and anticipated facility development.

Presently, WSAs are managed in accordance with the Bureau's "Interim Management Policy [IMP] for Lands under Wilderness Review" (H-8550-1, BLM 1995). Additional guidance has also been given when required; an instruction memorandum (IM, BLM 2003b) issued by BLM's Washington Office on September 29, 2003, noted that

> *"**BLM's authority to conduct wilderness reviews, including the establishment of new WSAs**, **expired no later than October 21, 1993**, with the submission of the wilderness suitability recommendations to Congress pursuant to Section 603 of the FLPMA; and… that the BLM is without authority to establish new WSAs." Further, it was determined that it is "… no longer BLM policy to continue to make formal determinations regarding wilderness character, designate new WSAs through the land use planning process, or manage any lands … except WSAs established under Section 603 of the FLPMA and other existing WSAs … in accordance with the non-impairment standard prescribed in the IMP."*

As such, public comments received during RMP scoping requesting consideration of additional WSAs are beyond the scope of the analysis for the RMP.[7]

The rescinded authority to consider new WSAs notwithstanding, the IMP also stated that the BLM is under obligation to review its lands for wilderness characteristics, a point reiterated in the 2005 revision of the Land Use Planning Handbook (BLM 2005a). These lands, if found to contain wilderness characteristics that need protecting, may be considered for special designation under other existing authorities.

2.19.2. Current Condition

Within the FOA, 11 WSA designations continue to be managed by BLM under the IMP for Lands under Wilderness Review (BLM 2003b), until Congress either designates them into the National Wilderness Preservation System (NWPS) or releases them from further wilderness study. BLM will not designate additional WSAs in the planning process, nor will they complete studies or make recommendations related to wilderness suitability.

In accordance with the 2005 Land Use Planning Handbook and the 1995 Interim Management Policy, the BLM convened the IDT during September 2008 to conduct a review of present conditions in the existing WSAs, and to determine whether potential wilderness characteristics were found in areas outside the

[7] See "Consideration of Wilderness Characteristics in Land Use Plans (Excluding Alaska)" (BLM 2003b) for further information.

existing WSAs. The areas analyzed outside of the WSAs included those areas previously analyzed in intensive and/or initial wilderness inventories in the late 1970s and early 1980s, as well as other public lands that met the minimum "roadless" size criteria under the Wilderness Act (16 U.S.C. 23 § 1131 et seq.) in their entirety on BLM-administered public lands or in coordination with adjacent USFS recommended wilderness lands. In all, 62 areas (including the WSAs) were reviewed (BLM 2008d). There have been no specific management actions to protect areas outside the existing WSAs that have potential for high wilderness character.

2.19.3. Trends

The remote and rural nature of the public lands within the PA has generally helped to protect the potential wilderness characteristics of the WSAs. Monitoring has revealed that some of the WSAs are vulnerable to impairments, primarily from increased OHV use.

For previously inventoried lands outside of WSAs, little has changed since the late 1970s, except for increased OHV use, to prompt BLM to consider more stringent protections. The IDT discovered that for the most part, public lands that did not meet prior requirements for "naturalness" or "outstanding opportunities for solitude or primitive recreation" in the original inventories also did not meet those requirements today. However, the team also noted some areas of improved ecological conditions and suggested that some of these areas might merit further consideration under other special management authorities (e.g., as ACECs) during the RMP planning process. Analysis units with degraded conditions were also noted in the 2008 review (BLM 2008d).

2.19.4. Forecast

For areas with wilderness characteristics that lie outside established WSAs, increased commercial development and recreation use may affect naturalness and outstanding opportunities for solitude/primitive recreation in high potential areas without management actions to preserve or protect these values.

2.19.5. Key Features

Wilderness characteristics, such as naturalness, and areas that offer solitude and are conducive to primitive or unconfined recreational experiences have been evaluated. As described in the Wilderness Act, naturalness occurs when an area "generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable."

Human sights and sounds outside the evaluation area should not automatically lead to a conclusion that the area lacks wilderness characteristics. Areas that offer solitude should provide "outstanding" opportunities for individuals to avoid sights, sounds, and evidence of other people. Factors influencing solitude may include natural screening, such as vegetation or topography, or the opportunity for a person to find a secluded spot.

Outstanding opportunities for unconfined, primitive recreation focus on undeveloped recreational activities or activities that do not require facilities or motorized equipment.

Based on the analysis from the IDT, none of the public lands analyzed outside of the WSAs were found to exhibit wilderness characteristics. This was because these public lands have been influenced by the

presence of man's work (in contrast to the requirement set forth in 16 U.S.C 1131 (c)(1)), resulting in poor opportunities for either solitude or a primitive and unconfined type of recreation. Based on this determination, the RMP will not further discuss wilderness characteristics.

This page left intentially blank.

2.20. Cave and Karst Resources

A cave is defined as any naturally occurring void, cavity, recess, or system of interconnected passages occurring beneath the surface of the Earth or within a cliff or ledge large enough to permit an individual to enter, whether or not the entrance is naturally formed or human-made (FCRPA, 16 U.S.C. 63 § 4301 et seq.). A cave resource is any material occurring in caves located on federal lands that is a biological, geological, mineralogical, paleontological, cultural, hydrologic or other fragile and non-renewable resource. In the Upper Snake PA, caves are commonly formed by the eroding effects of water and wind on limestone and conglomerate rock formations (i.e., erosion/solution caves) or through the solidification of basalt lava over and around a still flowing lava stream, which results in a long, hollow channel (i.e., lava tube).

A karst is a landform developed in limestone, gypsum, or other soluble rock types. Karst features and characteristics may include underground drainage, sinking streams, sinkholes, and caves. Karst features in the PA include numerous shallow caves and overhangs formed in sedimentary rock formations that border the Snake River Plain. Example caves located in the Upper Snake FOA would be the lava tube caves, and Civil Defense and Government Caves. Karst examples would be the limestone shelter caves located in the Black Canyon WSA and in the Skull Canyon area.

Archaeologists and historians have documented over 10,000 years of cave and karst resources use by Native Americans and Euro–Americans on the ESRP. Native Americans have used caves for temporary living quarters, food storage and processing areas, water sources, shelter, religious and ceremonial sites, and game traps. Today, caves retain a significant role in Shoshone–Bannock traditional cultural and religious practices. Euro–Americans have used caves in eastern Idaho for shelter, livestock pens and watering areas, tourist attractions, trash dumps, and illegal alcohol distilleries.

Some Upper Snake FOA lava tube caves have functioned as natural faunal traps for several thousand years. These caves have produced a unique stratified record of past Snake River Plain mammal populations. More carnivores than herbivores are represented. Some caves have yielded bones of mammals that are now extinct or no longer common on the Snake River Plain.

Cave resources are fragile due to their association with other resources such as groundwater hydrologic systems and biological communities. Caves are complex ecosystems not only because of the fragileness of their components (i.e., paleontological and archaeological deposits, speleothems [formations inside caves], and biological resources) but also because of the length of time the ecosystem needs to respond to changes in its condition. As such, caves, karsts and their associated resources are considered non-renewable.

The FCRPA was the first federal legislation to recognize caves and their contents as whole, integrated ecosystems. FCRPA declares significant caves on federally managed lands as an invaluable and irreplaceable part of the Nation's heritage. Improper use, increased recreational demand, urban spread, and a lack of specific statutory protection threaten caves. The purpose of FCRPA is to secure, protect, and preserve significant caves on federally managed lands for the perpetual use, enjoyment, and benefit of all people, and to foster increased cooperation and exchange of information between governmental authorities and those utilizing caves located on federal lands for scientific, educational, or recreation purposes. BLM policy and guidance for managing cave resources is to protect sensitive, fragile,

biological, ecological, paleontological, hydrological, geological, scientific, recreational, cultural, and other cave values from damage and to ensure they are maintained for the use by the public, both now and in the future (BLM 2008e).

BLM implementation regulations for FCRPA (43 CFR I § 37 et seq.) require public lands to be managed in a manner that, to the extent practical, protects and maintains significant caves and cave resources (43 CFR I § 37.2). In 2006, the BLM entered into a cooperative working relationship with the National Speloeological Society and Cave Research Foundation to support surveys, studies, planning, and management of cave resources (BLM and the National Speleological Society and Cave Research Foundation 2006).

2.20.1. Indicators

Upper Snake FOA cave and karst indicators include the presence of key or sensitive plant and animal species, presence or absence of cultural resources, degree of cave interior damage (or lack of evident intrusions), presence of rare or unique geological features, presence or absence of paleontological specimens, safety concerns, unique hydrologic systems or range and type of offered recreational experiences.

Cave condition is dependent on the resources the cave possesses and is determined through the following indicators:

- Biota—The cave serves as seasonal or year-long habitat for organisms or animals, or contains species or subspecies of flora or fauna native to caves, or are sensitive to disruption, or are found on state or federal sensitive, threatened, or endangered species lists. The FOA caves provide critical hibernacula and maternity roost habitat for a variety of bats, which includes the Townsend's big-eared bat (BLM sensitive, see **Section 2.11**, Special Status Species–Wildlife).
- Cultural—The cave contains, or is directly associated with, cultural resources that make the cave eligible for listing on the NRHP. These resources make the cave significant for its historical or prehistoric research importance, for its historical associations with local, regional, or nationally important persons or events or as a TCP. A cave with a significant cultural component(s) would be one with little loss of features through weathering, decay, erosion, intensive use or vandalism. There would also be little modification of the physical relationships of cultural materials or features associated with a cave and few or no intrusions that alter cave characteristics.
- Geological/mineralogic/paleontologic—The cave possesses one or more of the following features: geologic or mineralogic features that are fragile or exhibit interesting formation processes, or are otherwise useful for study; deposits of sediments or features useful for evaluating past events; or paleontological resources with potential to contribute useful education and scientific information.
- Hydrologic—The cave is part of a hydrologic system or contains water important to humans, biota, or development of cave resources.
- Recreational—The cave provides or could provide recreational opportunities or scenic values. A cave that attracts interest of use by providing easy/safe access to the high risk use of caving skills for observing unique and scenic cave features.

- Educational/scientific—The resource offers opportunities for educational or scientific use or is in a virtually pristine state, lacking evidence of contemporary human disturbance or impact, or the length, height, volume, total depth, or similar measurements are notable (43 CFR I § 37 et seq.).

2.20.2. Current Condition

Cave resources in the Upper Snake FOA have been recognized by BLM, local cave clubs, and caving enthusiasts as an important resource for many years. In 1994, the IFD, which includes all of today's Upper Snake FOA, signed a cooperative management agreement with the local National Speloeological Society organization called the Idaho Cave Survey (ICS, BLM and Idaho Cave Survey National Speleological Society 1994). The purpose of the agreement is to have ICS assist the BLM in the implementation of cave-related projects on public lands. The group has contributed thousands of volunteer hours of field work in cave inventories, monitoring, surveying, and cave restoration work.

The majority of the Upper Snake FOA caves formed in basalt lava tubes and lava flows that reflect the geologically volcanic history of the Snake River Plain. The FO's recorded caves are located throughout the extensive lava flow areas of the Snake River Plain primarily in two areas: west of Idaho Falls and south and west of Big Southern Butte, and east of the St. Anthony Sand Dunes and the Red Road.

In 2002, ICS completed a 2-year inventory of the first area and identifed 52 caves. Of these caves, 31 are located within the FOA, and all of these caves are basalt lava tubes. The rest of the caves are either lava tube caves or solution caves located in the Big Lost River, Little Lost River, and Birch Creek watersheds.

In 2000, the ICS completed a 2-year inventory of caves in the second area and identified 180 caves located just off of the Red Road. Of the 180 caves inventoried, 169 are located on IDL or BLM-administered public lands.

The Upper Snake FO and ICS partnership has been useful in identifing and recording cultural resources associated with the caves recorded by the 2000 and 2002 cave surveys. These supplementary inventories provide complete descriptions of cultural resources associated with FOA caves and baseline information for monitoring these resources. Of the identified caves to date, 61 have been recognized as potentially meeting the significance criteria (43 CFR I § 37 et seq.).

Cave management is guided by the Upper Snake River District Cave Management Plan (BLM 1999b), which also includes the Pocatello, Shoshone, and Burley FOs. Some management for caves in the Upper Snake FOA is stipulated under the Species Conservation Assessment and Conservation Strategy for the Townsend's Big-eared Bat (Pierson et al. 1999).

Cave resource management is a relatively new and emerging field. Guidelines to be considered in addressing resource demands include, but are not limited to, a regulation of surface disturbance in regard to future renewable energy developments, the avoidance of future ROW actions through any cave areas deemed to be significant, attempts to acquire resources through exchange, implementing fire suppression restrictions and geophysical exploration restrictions to comply with OHV restrictions, and applying the applicable VRM class guidelines for each cave unit.

2.20.3. Trends

Qualitative trend data for cave resources in the Upper Snake FOA are constantly being updated. Recreational cavers, or spelunkers, constitute the majority of cave use. Human visitations into caves, even by competent, careful cavers, can impact these resources to some degree. Recreational use in the majority of caves is considered low but is increasing as a result of increased interest of caves and the recreation activity of geo-caching. Continued and increasing use could result in increasing isolated vandalism and cultural looting. The Upper Snake FO has used CCS partnerships to identify and record cultural resources associated with caves recorded by the 1999–2002 cave surveys. These supplementary inventories provide complete descriptions of cultural resources associated with Upper Snake FOA caves and provide baseline information for monitoring these resources.

2.20.4. Forecast

Under current management, existing caves would continue to be monitored and new caves will be located and classified as "significant" or not. As significant caves are identified in the FOA, they would be formally designated and managed for protection subject to the Cave Management Rules for Idaho (BLM 1999c).

Additionally, winter hibernacula bat counts over the last 10 years has shown a slight upward trend of winter use in most cases except where wildfire has destroyed surrounding foraging habitat. It is reasonable to forecast continued use of the FOA caves by Townsend's big-earred bats.

2.20.5. Key Features

Caves in the FOA support the largest known winter populations of Townsend's big-eared bats and significant caves, as defined in 43 CFR I § 37 et seq., specifically 37.11(f), and the cultural resources located in the caves are all key features.

Resource Uses

2.21. Forestry

The Upper Snake FOA has approximately 50,000 acres of forest and woodland, of which (according to the best available data), approximately 25,000 acres is available for commercial consideration. **Figure A-17, Appendix A–Maps**, shows the commercial timber on the Upper Snake FOA. This information was originally derived in the late 1960s and was based on the USGS 7.5 minute quad maps. These stands were then field verified and inventoried. Portions of this original inventory, the Timber Productivity Capability Classification, have been updated as funding allowed during the 1970s, 1980s, and the early 1990s. Based on BLM staff observation over recent years, this inventory is suspected to be under representative of the current timber inventory available for commercial consideration. This is based on new road systems having been built since the original stand delineation and existing stands have expanded. However, until better inventory data is available, the RMP IDT will consider the 25,000 acres shown in **Figure A-17, Appendix A–Maps,** as a current and conservative estimate of FOA commercial timber.

The forest land in the FOA is primarily Douglas-fir, with drier sites being occupied by lodgepole pine. Much of the wetter Douglas-fir sites also have an aspen component as well. Riparian forest may contain spruce, aspen, Douglas-fir and sub-alpine fir and may be found in the higher elevations. Forest and woodland products include timber, house log material, posts and poles, and biomass, while special forest products may include such things as firewood, Christmas trees, and boughs.

Overstocking is a forest condition leading to weakened trees, making them susceptible to pest damage (Stewart et al. 1984). Overstocked Douglas-fir forests may show an increased susceptibility to insect and disease, decreased growth rate, and a reduction of shrub and forb density (Zimmerman and Neuenschwander 1984). The stress of drought is another contributor to the susceptibility of the Douglas-fir forest to insect and disease (Hamilton and Johnson 1994). The insect and disease relationship as it relates to conditions in dry forests has changed as forest structure has changed. Small populations of insects are to be expected, but when a forest is stressed from extended drought, insect populations increase, seriously impacting the health of the forest (Baily 1982). The ensuing spread of diseases and insect attack leads to increased tree mortality. An excellent example of these phenomena was the drought that occurred between 1985 and 1992, which triggered epidemic bark beetle (*Dendroctonus pseudotsugae Hopkins*) outbreaks across southeast Idaho, killing 25% of the Douglas-fir trees larger than 8 in. diameter (at) breast height (dbh).

Most of the problems associated with insects and disease in the western U.S. are occurring in forest types growing at their maximum drought tolerance. Historically these stands would have burned in 10 to 30-year fire frequency intervals. As a result of fire suppression the last decade, these stands are currently overstocked, by historical standards. The end result of drought and high tree density is over competition for water and nutrients, a dry forest, in poor condition, with touching crowns. Such characteristics make the trees highly susceptible to insect epidemics and catastrophic wildfire like those that swept through southwest Montana and central Idaho during the summer and fall of 2000.

The long-recognized, major contributing factor to the severity of wildfires is the buildup of fuels (Wilson and Dell 1971). According to the USGS, many forests and rangelands have accumulated an “unnatural

buildup" of fuels, setting "conditions for unnaturally intense fires that threaten communities, air, soil, water quality, and plant and animal species" (Higgins, Kruse, and Piehl 1989). As forests become more dense, competition among trees for limiting factors (i.e., moisture, sunlight, or nutrients) increases, stressing the trees and alerting insects that trees are vulnerable (O'Laughlin et al. 1993). Public forests throughout the region have become more susceptible to outbreaks of insects and diseases as well as severe fire (Quigley, Haynes, and Graham 1996).

Overly dense stands are a pervasive forest problem. Active management practices include thinning dense stands of trees, using prescribed fire to clean up debris, maintaining desired forest stocking conditions, and regenerating more resistant and resilient tree species (O'Laughlin et al. 1993). Reducing hazardous accumulations of fuel is one of the goals of the National Fire Plan's (NFP's) 10-year comprehensive strategy (USDA 2002) and is closely related to another goal—rehabilitation and restoration of fire-adapted ecosystems. The HFRA was instituted with the intent to reduce the risks severe wildfires pose to people, communities, and the environment. By protecting forests, woodlands, shrublands, and grasslands from unnaturally intensive and destructive fires, HFRA helps improve the condition of our public lands, increases firefighter safety, and conserves landscape attributes valued by society.

It is anticipated that forest and woodland management will continue with an emphasis on moving the resource toward desired densities, species composition, and structure so that they resemble the historic range of variability. Management will strive to promote healthy and vigorous coniferous forests that are resilient to wildfire, and where aspen occurs in the PA, management will be aimed at promoting healthy and vigorous aspen with minimal competition. In areas of juniper encroachment on sagebrush steppe habitat, it would be preferable to remove the juniper to reduce fuel loadings and help achieve a more natural fire cycle.

Maintenance of structural diversity of forests and woodlands is a key consideration for this resource, particularly the development of more acreage of mature forest structures, which are more resilient to wildfire. Fire management (i.e., influencing the frequency and intensity of wildfire) is also an important consideration in forest and woodland productivity.

2.21.1. Current Level

Currently, over 90% of BLM-administered forested lands within the PA, or nearly 40,000 acres, are in primarily mature age classes (90–110 years old). Young, thrifty stands of Douglas-fir, lodgepole pine and quaking aspen are rare. Generally, tree densities are high and natural regeneration is poor.

As shown in **Table 2-32**, during the last 60 years there have been 82 timber sales of various sizes, ranging from small firewood sales, clear cuts, and more recently to selective thinning. From 1949–1985 the Upper Snake FO conducted 67 timber sales totaling 17,136,000 board feet. Thirteen timber sales occurred from 1986–1991, totaling 1,784,000 board feet. These sales were a result of Mountain Pine beetle (*Dendroctonus ponderosae*) caused tree mortality in lodgepole pine. Since that time, lodgepole has been in an early seral stage and has received little to no management. Since 1992, the Upper Snake FO has had two timber sales totaling 7,880,000 board feet. Two stewardship contracts were awarded late in 2008 to remove approximately 775,000 board feet and thin 224 acres. Four sales located in the Kilgore area of the Upper Snake FOA are in the planning process to treat approximately 1,200 acres and remove about 5M

board feet. The forestry program also averages more than 50 vegetative permits (e.g., firewood, Christmas trees) each year. Since the 1970s, Douglas-fir has been the dominant commercial species.

Table 2-32. Upper Snake FO forestry sale history 1949 to 2004.

Sale Name	Acres	Douglas-fir MBF[a]	Lodgepole Pine MBF	Total MBF	Year
Dry Canyon	11	90	–	90	1949
Shotgun 1	17	126	13	139	1954
Shotgun 3	20	163	–	163	1954
Shotgun 2	19	155	–	155	1955
Shotgun 4	167	653	689	1,342	1957
Shotgun 5	1	–	3	3	1957
Moose Creek	142	1,136	–	1,136	1958
Shotgun 5[b]	1	–	4	4	1959
Dry Ridge	2	11	–	11	1959
Sheridan Ridge	1	–	8	8	1960
Sheridan Ridge 2	101	811	9	820	1962
Dry Ridge 2	2	–	14	14	1963
Dry Ridge 3-1	1	–	6	6	1963
Shotgun 12	14	–	118	118	1963
Shotgun 13	232	118	1,741	1,859	1963
Henry's Lake	19	–	151	151	1963
Shotgun 14	1	–	4	4	1964
Shotgun 15	1	–	9	9	1964
Shotgun 16-Two	5	–	40	40	1964
Pine Creek	2	20	–	20	1965
Dry Ridge Salvage	26	–	208	208	1965
Sheridan Ridge Salvage	2	17	–	17	1965
Willow Creek	1	–	5	5	1965
Antelope Ridge	164	1,264	50	1,314	1965
Shotgun 16-One	2	20	20	40	1965
Shotgun 22	1	–	9	9	1965
Shotgun 21	8	–	60	60	1966
Victor	1	–	10	10	1966
Dry Ridge 3-2	13	–	109	109	1967
Dry Ridge	75	–	600	600	1967
Shotgun 20	3	–	25	25	1967
Dry Creek One	91	722	45	767	1969

Sale Name	Acres	Douglas-fir MBF[a]	Lodgepole Pine MBF	Total MBF	Year
Bulton Butte	20	163	–	163	1969
Blue Creek	37	276	24	300	1972
Moose Creek 2	4	36	–	36	1974
Sheridan Ridge	13	108	–	108	1975
Irving Creek 2	2	14	1	15	1975
Dry Creek Two	62	–	500	500	1978
South Kilgore	64	–	518	518	1979
Shotgun	68	548	–	548	1979
South Kilgore	32	–	250	250	1979
Donut Hole #2	15	–	120	120	1980
Shotgun 6	33	–	351	351	1980
Shotgun 10-1	21	–	208	208	1980
Green Canyon	20	–	285	285	1980
1980 MLRA[b] Post n' Pole Sales	21	–	162	162	1980
Irving Creek Douglas-Fir	7	34	–	34	1981
Freemont One	54	–	433	433	1981
Shotgun Valley	22	–	156	156	1981
Clark Co. Firewood	1	7	–	7	1981
Freemont Two	8	–	62	62	1981
1981 MLRA Fuelwood Sales	31	–	204	204	1981
Jones Creek	15	–	233	233	1982
1982 MLRA Fuelwood Sales	47	–	379	379	1982
July Creek	70	–	430	430	1983
Tanner Pass	40	–	–	0	1983
Button Butte	10	–	85	85	1983
1983 MLRA Fuelwood Sales	45	–	366	366	1983
1984 MLRA Fuelwood Sales	33	–	270	270	1984
1984 MLRA Post n' Pole Sales	6	–	50	50	1984
Df-Sawlog Five Veg Contracts	17	160	–	160	1985
1985 MLRA Fuelwood Sales	67	–	537	537	1985
Willow Creek Resale	10	–	90	90	1986
Shotgun 9 Resale	15	–	101	101	1986
Donut #2 Resale	33	–	243	243	1986
1986 MLRA Fuelwood Sales	10	–	86	86	1986
1986 MLRA Post n' Pole Sales	4	–	35	35	1986

Sale Name	Acres	Douglas-fir MBF[a]	Lodgepole Pine MBF	Total MBF	Year
Green Canyon Resale	25	–	202	202	1987
Shotgun 10-2	24	–	307	307	1987
Kilgore 2	40	122	–	122	1987
1987 MLRA Fuelwood Sales	10	–	86	86	1987
North Leigh Creek Sanitation	93	–	250	250	1988
1988 MLRA Fuelwood Sales	8	–	66	66	1988
Patelzick Creek Timber Sale	35	171	–	171	1989
Holden	10	25	–	25	1991
July Creek	513	2,509	–	2,509	2004
Antelope Ridge	805	5,371	–	5,371	2004[c]
Total	3,771	14,850	11,950	26,800	–

a. Thousand Board Feet (1 MBF = 1,000 board feet. For example: 1,859 MFB = 1,859,000 board feet)

b. Medicine Lodge Resource Area

c. Last active timber sale

The Upper Snake FO's fuels program, in coordination with the forestry program, is also actively thinning younger stands of lodgepole pine and Douglas-fir in WUI areas. Currently there are approximately 200 acres of thinning that are under contract, with another 1,000 acres planned in the next few years. During the past 20 years, it is estimated that 750 acres have been treated in younger un-merchantable stands.

Data on past acres of planting are incomplete; however, using the data available and knowledge of the area, the BLM estimates that approximately 900 acres have been planted in the Upper Snake FOA between 1980 and 1991. It is possible that more acres have been planted.

2.21.2. Forecast

During the past 50 years, Idaho forest species composition has shifted and forest-growing stock volumes have increased by 37% (O'Laughlin 2002). Growing stock includes trees at least 5 in. dbh. More volume per unit area signals increased forest density. Much of the increase is in Douglas-fir, while ponderosa pine and western white pine (*Pinus monticola*) have decreased (O'Laughlin 2002). Unlike pines, Douglas-firs have branches from the ground up, providing "ladder fuels" that can turn otherwise favorable ground fires into catastrophic crown fires, especially in dense stands (O'Laughlin et al. 1993).

During the last 10 years, the level of mortality in Idaho's forests has increased by 50%. Annual removals, consisting almost entirely of timber harvests, have declined dramatically since 1980. For the first time in a half-century, annual net growth has declined from the previous measurement period, but still exceeds removals by 67%. This increase in tree mortality and decrease in timber management activities has resulted in an increase of flammable fuels from live, dead and dying trees, increasing the fuel loading in the forests (O'Laughlin 2002).

Forests are continually being altered by a combination of factors, such as fire, climate, insects, disease, timber harvest, livestock grazing, and exotic species introduction. Disturbances in the PA typically follow cycles of infrequent, high-intensity events (e.g., drought, floods, or crown fires) interspersed with frequent low intensity events (e.g., non-lethal underburns, wildlife grazing cycles, or scattered mortality from insects). Such changes determine forest productivity in terms of wildlife habitat, forest products, and recreational opportunities (U.S. Departments of Agriculture and Interior 1997).

Planned revisions to management of the commercial forestland in the Upper Snake FOA will result in a probable sale quantity that may range between 400–900 MBF each year. Any new management direction will help address forest health concerns of the commercial forestlands in the FOA.

2.21.3. Key Features

The location of BLM-administered forested public lands is often referred to as "foothill forest." These foothill forests often overlap with WUI areas and fuel reductions may be a primary concern. Since the early 1900s, the majority of these foothill forests have remained relatively wildfire-free in spite of the periodic wildfires that have passed through the region.

WUI areas are key features for forest and woodlands within the PA. Proper management of these areas is essential to minimize the potential for and intensity of wildfires.

2.22. Livestock Grazing

2.22.1. Current Level

Livestock grazing within the Upper Snake FOA is administered on 361 allotments encompassing approximately1,600,870 acres of public lands (88% of the FOA) for an approximated total permitted use of 180,690 AUMs (**Figures A-18, A-19, A-20**, and **A-21**, **Appendix A–Maps**). In addition, through two MOUs (BLM and DOE 2008, BLM 2007b) the Upper Snake FO also administers livestock grazing within a portion of the Craters of the Moon National Monument and Preserve on BLM-administered public lands and on withdrawn public lands within the INL. Of these 361 allotments, 9 allotments overlap the boundary between the Craters of the Moon National Monument and Preserve and Upper Snake FOA (shown on **Table 2-33**) and 8 allotments overlap the boundary between the INL and Upper Snake FOA (shown on **Table 2-34**).

Of the 9 allotments, the Upper Snake FO manages 76,082 acres of BLM–administered public lands within the Craters of the Moon National Monument and Preserve. This public lands acreage was originally located entirely within the Upper Snake FOA until the creation of the Monument in 2000. Of the 8 INL allotments, the Upper Snake FO manages 291,128 acres of withdrawn public lands within the INL boundary. Acreage and AUM information for the Upper Snake FO allotments are shown in **Table 2-35**.

The FO also manages 291,128 acres of land within the boundary of the INL and eight grazing allotments that are located partially within the INL boundary and partially within the Upper Snake FOA. Through a MOU with the DOE (BLM and DOE 2008), the Upper Snake FO manages the entirety of these grazing allotments. Acreage and AUM information for these allotments is shown in **Table 2-34**.

Table 2-33. Acreage and AUMs of allotments located partially within the Craters of the Moon National Monument and Preserve.

Allotment Name	Total Acres	Acres in Monument	Acres in Upper Snake FO	Total AUMs	AUMs in Monument	AUMs in Upper Snake FO
Big Desert Sheep	224,268	53,950	170,318	29,290	6,710	22,580
Blizzard Mountain	1,960	160	1,800	637	26	611
Cox's Well	19,640	6,650	12,990	2,125	659	1,466
Craters	7,250	800	6,450	230	88	142
Huddle's Hole	652	652	0	24	24	0
Quaking Aspen	73,232	2,880	70,352	6,019	241	5,778
Rudeen	12,720	6,600	6,120	879	378	501
Smith	20,873	2,790	18,083	2,386	352	2,034
Sunset	12,141	1,600	10,541	1,516	197	1,319
Total	372,736	76,082	296,654	43,106	8,675	34,431

Table 2-34. Acreage and AUMs of allotments that are located partially within the INL.

Allotment Name	Total Acres	Acres in INL	Acres in Upper Snake FO	Total AUMs	INL AUMs	AUMs in Upper Snake FO
Big Butte	42,440	6,000	36,440	3,755	276	3,479
Deadman	56,460	29,720	26,740	2,586	1,000	1,586
Howe Peak	33,193	18,209	14,984	2,451	1,320	1,131
Mahogany Butte	53,451	17,516	35,935	2,017	664	1,353
Quaking Aspen	73,232	17,075	56,157	6,019	1,385	4,634
Sinks	21,055	19,781	1,274	1,530	1,438	92
Twin Buttes	269,627	172,660	96,967	15,127	7,796	7,331
Wigwam Butte	15,287	10,167	5,120	966	600	366
Total	564,745	291,128	273,617	34,451	14,479	19,972

2.22.2. Forecast

Implementation of Idaho Standards for Rangeland Health (BLM 1997a) has helped to improve rangeland condition in the Upper Snake FOA. The standards and guides along with an active rangeland monitoring program will help ensure that the rangelands in the PA remain healthy or are making progress towards achieving standards. When allotments are not meeting standards or resource objectives, the FO adjusts AUMs and/or grazing systems to improve rangeland health. Drought conditions and rangeland wildfire will continue to threaten rangeland health. Overall, the amount of AUMs available for livestock grazing in the Upper Snake FOA should remain stable.

In 1998, the FO began the process of assessing the rangeland health of grazing allotments with the Idaho Standards for Rangeland Health (BLM 1997a). There are eight standards of rangeland health in the state of Idaho. As of September 2009, assessments have been completed on 329 allotments, totaling approximately 1,960,350 acres. The assessments found that 182 allotments (742,704 acres) were meeting all applicable standards; 39 allotments (641,037 acres) were making progress towards meeting standards; 56 allotments (426,990 acres) were not meeting one or more standards and current livestock grazing was determined to be the cause; and 52 allotments (149,619 acres) were not meeting one or more standards and current livestock grazing was not the cause.

2.22.3. Key Features

The type of range sites in the area are influenced by soils, precipitation, and temperature. Each range site is capable of producing a certain kind of vegetative community. The amount of forage available to sustain a viable grazing operation is directly related to the type of vegetative community that occurs at each site. **Section 2.8**, Vegetation—Upland Vegetation and Habitats, details vegetation information and acreages for the Upper Snake FOA. Grazing allotment information for all 361 allotments within the PA is shown in **Table 2-35**. The allotments are shown by map area number on **Figures A-18, A-19, A-20, and A-21, Appendix A–Maps.**

Table 2-35. Upper Snake PA grazing allotment information.

Map Area Number	Allotment Name	Public Acres in Upper Snake FO	AUMs	Season of Use	Livestock Kind[a]
1	Aikele	1,871	120	5/15–8/20	C
2	Airport	7,659	1,030	4/20–6/19, 10/16–12/30	C
3	Alder Creek	6,320	580	5/16–7/31	C
4	Allotment #7	52	11	5/1–5/17	C
5	Allotment IV	800	113	11/1–11/16	C
6	Allred Brothers	62	13	5/1–9/30	C
7	Antelope Ridge	360	93	6/1–9/30	C
8	Antelope Valley	2,042	310	6/5–11/15	C
9	Appendicitis Hill	5,214	360	5/1–6/1	C, S
10	Applewood	38	8	5/15–6/5	C
11	Arco Peak	6,935	303	4/16–9/7	C
12	Bear Canyon	3,538	258	6/1–10/18	C
13	Beatrice Blakely	90	20	5/15–6/5	C
14	Beaver Creek	167	32	5/1–10/31	C
15	Beck Canyon	1,852	128	5/1–10/15	C
16	Bench	3,580	525	5/1–6/25	C, S
17	Bernice	23,327	919	11/23–2/5	S
18	Berrett	2,945	75	5/1–5/31	C
19	Beverland Pass	7,168	555	5/1–9/30	C, S
20	Big Bend	44	9	6/1–9/15	C
21	Big Butte	36,440	3,479	4/1–12/31	C
22	Big Desert Sheep	170,318	22,580	4/10–5/31, 10/16–1/31	S
23	Big Grassy	12,464	1,809	5/1–6/15, 10/10–12/17	C
24	Big Sage	880	155	5/26–6/9, 10/20–11/28	S
25	Birch Creek	24,040	1,184	5/16–7/15	C
26	Birch Creek ML	40	5	5/10–11/15	C
27	Bitch Creek	140	19	6/15–11/1	C
28	Bitterbrush	1,640	241	11/15–12/30	C
29	Bliss	940	118	5/1–11/15	C
30	Blizzard Mountain	1,800	611	6/1–6/30, 7/1–11/30	C
31	Blue Creek	960	269	5/1–10/15	C
32	Bluestem	2,920	180	5/20–5/30	C
33	Bone	40	10	5/15–10/15	C

Map Area Number	Allotment Name	Public Acres in Upper Snake FO	AUMs	Season of Use	Livestock Kind[a]
34	Border	149	38	6/1–6/30	C, H
35	Boundary	1,498	70	6/16–7/2	C
36	Bowers	320	40	4/10–10/30	C
37	Box Canyon	4,459	563	9/16–11/30	C
38	Buck Springs	2,280	368	5/15–7/31, 9/1–10/14	C
39	Bull's Fork	40	10	6/1–10/31	C
40	Burnside	440	90	5/21–6/14	C
41	Burnt Canyon	5,713	300	6/30–9/30	C
42	Butte Canal	11,371	1,135	5/1–6/20, 11/20–12/22	C
43	Button Butte	320	82	7/25–9/28	C
44	Camas Butte	23,709	4,234	4/15–7/4, 10/1–1/1	C, S
45	Camas Meadow	3,745	870	6/15–11/15	C
46	Canyon	570	114	5/1–5/31, 11/20–12/29	C
47	Carl Johnson & Sons	170	41	6/15–10/31	C
48	Carter	79	20	5/1–6/7	C
49	Cedar Butte	13,262	971	5/1–6/15, 11/16–12/30	C
50	Cedarville	33,596	4,312	5/1–8/15, 10/1–1/31	C
51	Champagne Creek	1,812	197	4/1–11/15	C
52	Checkerboard	3,037	358	5/1–6/30, 9/15–10/5	S
53	Cherry	240	24	6/1–10/6	S
54	Chicken Creek	5,120	577	5/11–10/15	C
55	Ching Creek	1,448	414	8/1–8/28	C
56	Chokecherry	2,254	533	5/10–6/30, 9/10–1/28	S
57	Cinder Butte	4,653	613	5/28–11/30	C
58	Cinder Cone	13,332	1,150	4/8–6/7	C
59	Clough	38	8	6/1–2/28	C
60	Cole Canyon	4,420	1,686	7/12–8/7	C
61	Conant Valley Ranch	839	158	5/17–10/30	C
62	Cook	160	36	5/15–6/30, 9/15–10/30	C
63	Cool Creek	450	80	5/1–11/7	C
64	Cottonwood	80	26	8/15–9/30	C
65	Cottonwood River	263	53	5/1–6/30	C
66	Cow Camp	240	40	5/1–5/31	C
67	Cox's Well	12,990	1,466	4/15–9/19	C

Map Area Number	Allotment Name	Public Acres in Upper Snake FO	AUMs	Season of Use	Livestock Kind[a]
68	Craters	6,450	142	6/15–6/30, 11/1–11/20	S
69	Croft	1,440	68	4/1–5/30	C
70	Crooked Creek	56,180	6,502	4/16–2/16	C, S
71	Crooked Road	2,983	649	4/20–6/15, 9/14–12/26	S
72	Crystal Butte	905	256	6/1–10/24	S
73	Dale Suitter	40	10	5/1–11/30	C
74	Darryl Walker	400	118	5/1–6/2	C
75	David Loertscher	1,811	453	5/25–10/10	C
76	Davis Lake Livestock	430	98	6/16–10/16	C
77	Deadman	26,740	1,586	4/1–12/15	C, S
78	Diversion	15	10	4/15–6/1	C
79	Donal Brown	49	9	6/1–10/6	C
80	Dry Canyon	289	72	6/1–10/6	C
81	Dry Creek	4,560	1,107	5/1–7/10, 9/11–12/15	C, H
82	Dry Fork	4,116	203	6/15–11/15	C
83	Dry Lake	3,736	708	5/1–7/25, 10/26–12/4	S
84	Dry Ridge	860	215	6/1–10/22	C
85	Dutch Flat	5,495	448	3/10–3/9	C
86	Eagle View	64	26	5/1–6/30	C
87	Earl Smith	2,200	426	5/4–6/30	C
88	East Dubois	2,093	537	5/15–11/27	C
89	East Indian Creek	1,580	250	5/15–10/26	C
90	East Monida	100	38	6/1–10/31	C
91	East Willow Creek	130	30	5/27–7/25	S
92	Edie Creek	16,610	4,202	5/10–7/11	C
93	Egin Lakes	2,350	297	4/15–5/6, 11/10–12/1	C
94	Eighteen Mile	900	234	6/1–11/1	C
95	Elbow	7,140	431	5/1–6/2	C
96	Elkhorn	7,390	704	6/1–11/1	C
97	Elkington	480	73	5/20–9/15	C
98	Ellis	2,400	273	5/5–6/25	C
99	Enget	80	20	8/1–9/30	C, S
100	Enterprise	35	16	6/1–9/30	C
101	Era Flat	740	55	9/15–11/30	C

Map Area Number	Allotment Name	Public Acres in Upper Snake FO	AUMs	Season of Use	Livestock Kind[a]
102	Experiment Station	3,600	533	5/16–11/9	C
103	Fall River	34	7	05/10/02	S
104	Ferguson	400	100	6/1–9/30	C, S
105	Fisher	80	30	5/1–5/30, 10/10–11/9	C, H
106	Five Monuments	3,640	376	5/1–7/5, 9/1–9/26	S
107	Five-Ways	359	72	5/1–6/30	C
108	Floyd Sykes	16	8	5/15–7/15	H
109	Fog Butte	1,400	289	6/15–9/23	C
110	Francis Beam	120	20	5/15–9/30	C
111	Freeman	62	26	5/1–10/31	C
112	Fritz Creek	260	31	6/1–7/11, 10/30–12/10	C
113	Fullmer	30	30	6/1–8/31	C
114	G. Ray Clement	80	40	4/1–11/30	C
115	Gale W. Clement	1,837	409	6/1–9/1	C
116	Garden Creek	80	14	5/1–6/30,8/1–9/30	C
117	Gardner Lake	320	39	7/1–9/30	C
118	Gary Zohner	280	51	6/1–8/31	C
119	Gas Caves	3,280	555	5/1–6/30, 9/10–11/13	S
120	George	972	94	6/1–9/13	C
121	Gerald Gallup	155	32	6/1–9/1	C
122	Gerber	1,840	263	12/6–12/31	C
123	Gneiting	610	82	5/10–8/30	C
124	Goodman Canyon	1,411	129	5/1–9/30	C
125	Goodwin	39	15	7/1–7/31	C
126	Grandview	160	20	5/15–6/15, 10/10–10/30	C
127	Grassy Ridge	3,532	554	4/15–1/16	C, H
128	Grassy Road	760	87	4/27–5/25	C, S
129	Gray’s Lake	1,412	278	5/1–5/28, 10/20–10/26	C
130	Green	800	134	6/1–6/30, 8/15–10/30	S
131	Grover Browning	40	16	8/31–11/30	C
132	Gunnarson	55	36	8/1–9/15	C
133	H. Hamilton	12	6	5/1–10/31	C
134	Hamilton	51	11	7/1–8/2	C
135	Hammond Canyon	3,100	205	5/1–10/30	C

Map Area Number	Allotment Name	Public Acres in Upper Snake FO	AUMs	Season of Use	Livestock Kind[a]
136	Harger Point	3,280	280	5/1–6/30, 11/1–11/30	C
137	Harry Lewies	86	10	5/15–9/15	C
138	Hawkins Spring	20	10	6/15–8/15	C
139	Hawley Mountain	53,320	4,855	5/1–12/26	C, H
140	Heart L	440	110	5/15–10/15	C
141	Heise Hot Springs	540	11	6/15–9/30	H
142	Hell Creek	1,048	116	5/17–7/25	C
143	Hell's Half Acre	250	28	5/1–5/28	C
144	Henry's Fork	40	8	5/15–6/15	C
145	Henry's Lake	40	10	6/15–9/30	C
146	Henry's Lake Outlet	80	27	6/15–9/30	C
147	Highbridge	1,846	465	5/1–7/10	C
148	Highway	200	57	5/15–6/1	C
149	Highway 26	5	3	5/1–6/30	C
150	Hill	83	33	5/17–9/30	H
151	Hittson	90	30	7/1–11/1	C
152	Holland Canyon	200	50	5/15–10/15	C, S
153	Horsebrush	5,070	875	5/1–5/30	C, S
154	Horseshoe Slough	55	2	5/15–5/31	C
155	Hoskins	128	56	5/1–6/30	C, H
156	Hot Springs	3,554	268	4/20–5/5, 11/10–11/13	S
157	Houghland	25,083	2,709	4/1–9/5	C
158	House	1,127	72	5/5–5/29	C
159	Howard Andrus	160	27	5/1–6/15	C
160	Howe Peak	14,984	1,131	5/1–6/1, 11/1–1/10	S
161	Huggins	720	58	6/1–9/25	C
162	Hump Ditch	1,360	455	5/20–9/13	C
163	Hump Lake	460	84	7/1–10/30	C
164	Ice Cave	2,438	326	5/10–6/30, 10/22–11/24	S
165	Indian Creek	6,940	1,136	6/18–10/20	C
166	Indian Creek Butte	400	72	9/1–10/31	C
167	Iona Hills	120	30	4/25–5/15	C
168	Irving Creek	45	12	6/25–9/30	C
169	Island Park	244	61	6/15–9/15	C

Map Area Number	Allotment Name	Public Acres in Upper Snake FO	AUMs	Season of Use	Livestock Kind[a]
170	Jacobs	240	40	7/1–9/30	C
171	Jacoby Ranch	796	148	4/1–12/31	C, H
172	James Beard	119	30	6/1–11/1	C
173	Jenkins Well	1,185	325	5/6–6/15, 9/16–11/20	C
174	Jesse & Son Croft	40	10	5/1–6/30, 9/1–10/31	C, S
175	Jesse Weeks	120	24	5/15–9/30	C
176	Judd Brown Canyon	3,740	540	5/15–8/15	C
177	Judge	80	12	4/1–10/30	C
178	Jumpoff	14,677	562	4/10–9/30, 11/1-11-30, 1/1–1/20	C
179	Junction	160	18	7/15–10/15	C
180	Junipers	12,327	468	3/1–2/28	H, S
181	Keith Bramwell	280	56	5/1–5/31,9/1–10/24	H
182	Keith Saurey	120	24	5/01/06	C
183	Kelly Island	242	49	5/15–9/5	C
184	Kettle Butte	2,228	279	4/15–6/7	C
185	Kilgore	237	30	6/1–8/31, 10/1–12/20	C
186	King Spring	3,960	460	6/16–11/11	C
187	Klempel	320	29	4/1–5/15	C
188	Kyle Canyon	711	43	7/7–9/12	C
189	Lake Hollow	1,870	470	5/1–12/4	C, H
190	Last Chance	789	181	5/1–7/1,10/11–12/01	C
191	Latham Hollow	5,060	665	5/1–6/30	C
192	Lathen Jacobson	16	5	5/10–10/15	C, H
193	Laudy Tomchak	41	9	3/1–2/28	C, H, S
194	Lava Creek	3,442	567	7/1–10/15	C, S
195	Lava East Camas	8,375	1,386	5/1–6/30, 9/16–12/21	S
196	Lawrence Blakely	94	40	5/1–6/30	C
197	Leonard Carlson	80	16	10/1–11/10	C
198	Leslie Butte	1,210	133	5/1–5/31	C
199	Little Kelly Canyon	667	121	5/1–6/15	C
200	Lloyd Mickelson	39	13	6/5–9/30	C
201	Lorenzo	129	26	5/1–6/30	C
202	Lowell Birch	15	8	4/1–10/31	C

Map Area Number	Allotment Name	Public Acres in Upper Snake FO	AUMs	Season of Use	Livestock Kind[a]
203	Lowell Horman	9	2	4/15–2/14	C
204	Lower Lodge	640	80	5/1–11/30	C
205	Lower Rattlesnake	480	88	5/16–7/1	C
206	Lucky Strike	135	30	8/1–9/30	C
207	Lyle Taylor	80	40	4/1–11/30	C
208	M A Harris	40	6	9/15–10/15	C
209	Magic Valley	63	35	8/1–11/30	C
210	Mahogany	3,870	300	5/1–6/30	C
211	Mahogany Butte	35,935	1,353	3/1–6/30, 12/1–2/28	S
212	Marriott	94	31	6/15–10/15	H
213	Marsh Canyon	1,289	174	5/10–6/15	C
214	Mcgarry Canyon	90	12	8/1–8/14	C
215	Mcgee-Berry Canyon	4,336	442	5/12–10/11	C
216	Menan Butte	4,900	757	5/1–6/15, 10/15–11/14	C
217	Mesa	2,480	280	5/8–5/27	C
218	Meyers	4,854	798	4/15–5/25, 10/20–12/21	C
219	Mickelsen	382	108	5/1–9/30	C
220	Middle Creek	14,120	3,593	5/23–10/31, 11/15–12/15	C, S
221	Milk Creek	80	10	5/1–9/30	C
222	Monida	940	214	6/1–10/31	C
223	Morgan’s Crater	701	186	5/1–10/14	C, H, S
224	Moss	264	72	10/1–11/15	C
225	Muirbrook	120	2	4/15–6/15, 9/1–10/15	C
226	Murray	45	14	6/1–7/6	C
227	Ne Knolls	314	97	5/1–6/30	C
228	Needle Butte	20,187	2,563	5/1–10/09	C, S
229	Needle Grass	2,400	450	5/1–5/31, 10/16–11/30	C
230	Newman Canyon	3,699	428	4/1–6/15	C
231	Nichols	603	38	7/1–8/4	C
232	Nine Mile Knoll	11,222	1,275	5/1–6/20	C
233	No. 2 Well	25,176	1,537	4/8–6/22	C
234	North Butte	4,640	428	5/1–6/14, 10/1–11/28	C
235	North Dubois	2,113	402	5/1–7/1, 10/15–12/13	C
236	North Hawgood	5,825	630	5/1–6/10, 12/1–12/30	C

Map Area Number	Allotment Name	Public Acres in Upper Snake FO	AUMs	Season of Use	Livestock Kind[a]
237	North Kettle	80	11	4/15–6/10	C
238	North Mickelsen	207	32	5/1–5/15, 11/15–12/07	C
239	O'Brien	480	32	4/1–7/1	C
240	Obsidian	2,464	386	5/1–11/28	C
241	Old Farm	120	12	4/27–5/15	C
242	Owen Grube	80	10	5/1–7/31	C
243	Park	1,209	53	5/10–6/15	C
244	Patelzik Creek	6,210	1,402	5/10–11/30	C, H
245	Petersen	80	5	5/15–6/14, 10/20–11/19	C
246	Phyllis Laird	160	41	6/16–10/14	C
247	Pine Butte	10,245	1,896	6/1–10/15	C, S
248	Pine Canyon	360	100	6/15–10/12	C
249	Pine Creek	1,120	164	5/1–12/24	C
250	Pinnacle	59	8	5/1–5/31, 10/1–11/15	C
251	Plano	3,350	400	5/1–6/30	C
252	Polatis	79	32	9/1–9/30	C
253	Potpourri Ranch	40	7	7/1–10/1	C
254	Quaking Aspen	53,277	4,393	4/15–10/31	C
255	Quarter Circle O	1,825	322	5/1–5/31,10/15–12/31	C
256	Quayles	220	30	5/15–12/15	H
257	Radar Hill	40	6	5/10–12/15	C
258	Ramshorn Canyon	4,240	913	5/1–6/30, 10/15–11/10	C
259	Ranger Station	135	20	5/1–5/31	C
260	Rattlesnake	1,280	373	5/15–11/30	C
261	Red Hills	24,376	1,440	5/21–10/31	C
262	Red Road	2,222	363	5/1–6/30, 10/15–10/25	S
263	Reno Point	2,185	351	5/15–9/1	C
264	Rigby	2,590	230	4/30–6/15	C, H
265	River Bottom	320	80	4/1–9/1	C
266	Riverside	126	42	5/15–11/14	C
267	Robertson	16	3	7/1–8/30	C
268	Robinson	364	75	4/15–4/21, 11/1–11/10	C
269	Rock Corral	22,042	1,346	4/15–7/7, 10/15–12/15	C
270	Rockwood	120	19	6/1–9/30	C

Map Area Number	Allotment Name	Public Acres in Upper Snake FO	AUMs	Season of Use	Livestock Kind[a]
271	Rocky Canyon	620	119	5/10–6/25	C
272	Rudd	126	23	5/16–9/30	C
273	Rudd Well	1,501	676	5/1–6/15, 10/5–12/23	C
274	Rudeen	6,120	501	4/1–10/30	C
275	Russell	265	30	5/20–6/2	C
276	Sage Junction	4,820	472	5/5–6/15, 11/1–12/20	C
277	Salisbury	175	59	6/15–9/15	C
278	Sand Creek	2,150	550	5/1–6/18, 9/6–12/8	C
279	Sandy Butte	5,840	1,318	6/1–7/31, 10/1–11/19	C
280	Savage	40	5	5/5–5/20	C
281	Sawmill Canyon	5,839	579	7/16–8/13	C
282	Scott	61	2	9/1–9/30	C
283	Serviceberry	4,576	382	6/1–9/30	C
284	Sheep Mountain	7,810	756	5/1–11/14	C
285	Sheridan	1,345	450	5/26–9/30	C
286	Shotgun Valley	5,367	1,344	6/1–10/31	C
287	Sinks	1,274	92	5/1–10/5, 1/1–2/15	C
288	Smith	18,083	2,034	4/21–9/20	C
289	Snowshoe Butte	1,080	228	5/15–7/5, 9/6–10/15	S
290	Sorensen	1,540	137	6/1–9/14	C
291	South Bank	22	3	10/1–11/30	C
292	South Dubois	1,083	170	5/1–6/15, 10/15–12/13	C
293	South Hawgood	7,380	592	5/1–6/20	C
294	South Shore	599	96	6/1–10/31	C
295	Southwest	6,200	545	3/1–4/30, 2/15–2/28	C
296	Spencer	1,400	338	5/21–9/30	C
297	Split Butte	40	10	6/16–10/10	C
298	Spring Canyon	15,525	975	11/1–1/5	C
299	Spring Creek	515	51	6/1–6/15, 8/25–9/10	C
300	Springfield	34,546	2,887	4/15–6/10	C
301	Squaw Creek	17,949	1,754	6/1–7/15	C
302	Stageroad	20,890	1,040	4/16–6/5, 10/1–12/10	C
303	Staley Springs	120	53	6/5–8/30	C
304	Stecklein	210	99	5/15–10/1	C

Map Area Number	Allotment Name	Public Acres in Upper Snake FO	AUMs	Season of Use	Livestock Kind[a]
305	Stinking Springs	2,890	303	5/1–5/31	C
306	Stoddard Creek	1,060	78	5/1–10/31	C
307	Sulfer Lake	3,600	280	10/17–10/30	C
308	Summit	3,216	270	7/1–10/29	C
309	Sundown	360	86	7/1–10/31	C
310	Sunnydell Canal	135	28	5/1–10/15	C
311	Sunset	10,541	1,319	4/15–10/31	C
312	Swan Valley	330	12	10/1–12/1	C
313	Swan Valley Bridge	182	41	5/1–10/31	C, S
314	Swenson's Knoll	561	133	5/23–7/10, 9/1–10/19	C, S
315	T S Winther	80	20	5/15–11/1	C
316	Techick Canyon	2,723	190	7/16–9/15	C
317	Teton	160	53	6/15–7/31	C
318	The Point	113	35	5/1–6/30	C
319	The Wall	54	19	6/1–8/31	C
320	Thornspring Ranch	140	54	5/15–7/14	C
321	Three Mile	754	190	6/16–11/12	C
322	Three Mile Butte	2,900	972	6/1–11/15	C, S
323	Three Section	600	100	4/20–7/5, 10/16–12/31	C
324	Three Springs	22,716	1,806	5/2–5/31, 11/1–11/16, 12/16–1/4	C, S
325	Thunder Gulch	6,490	1,473	6/1–7/15, 10/1–10/21	C
326	Trail Creek	4,980	342	5/1–10/15	C,H
327	Trestle	269	70	5/5–5/31,10/12–10/31	C
328	Twenty Mile	40	5	4/1–6/30	C
329	Twin Bridges	210	42	5/1–10/31	C
330	Twin Buttes	96,967	7331	4/1–5/31, 11/15–2/8	S
331	Two Counties	3,104	972	5/16–10/31	C
332	Uncle Ike Creek	27,872	903	5/1–9/30, 11/1–1/30	C
333	Upper Tex Creek	40	10	6/1–11/15	C
334	Valley	5,317	1,083	4/10–9/30	C
335	Victor	3,543	268	5/25–7/15, 9/9–9/25	C
336	Waddoups Canyon	14,690	1,384	5/25–7/10	C
337	Walter Gay	40	8	6/1–10/15	C

Map Area Number	Allotment Name	Public Acres in Upper Snake FO	AUMs	Season of Use	Livestock Kind[a]
338	Warm Creek	5,990	1,680	5/15–12/15	C, H
339	Wayne Davis	56	19	5/01/01	S
340	WBW	20,310	1,994	5/16–6/30, 11/16–12/31	C
341	We Farms	320	78	7/1–7/25, 9/1–9/30	C
342	Webb	760	69	4/1–5/12	C
343	Weber Creek	2,180	1,456	5/1–8/7, 8/27–12/1, 1/5–1/13	C, S
344	Weeks Brothers	69	17	5/1–10/31	C, S
345	West Cedar Butte	3,040	500	5/1–6/1, 11/1–11/29	C
346	West Crater Butte	640	166	6/1–6/15, 9/15–10/11	S
347	West Dubois	2,820	600	5/1–8/15,11/1–12/30	C
348	West Monida	1,358	494	6/1–10/31	C, H
349	West Ridge	1,240	220	10/1–12/24	C
350	West Willow Creek	450	20	6/16–7/15	C
351	White Sands	4,800	1,325	5/1–6/20, 9/16–12/30	C
352	Wigwam Butte	5,120	366	5/1–7/3, 1/1–2/15	C
353	Wild Rose	40	10	6/1–9/30	C
354	William Holden	40	5	7/15–9/1	C
355	Williams Creek	5,363	171	5/16–6/30, 11/16–12/15	C
356	Willow Corner	160	54	5/15–10/15	C
357	Winsper	80	20	4/15–4/21	C
358	Wood	160	13	5/1–6/8	C
359	Wright	400	50	6/26–7/20, 8/31–9/20	C
360	Yale Road	440	37	8/1–9/30	C
361	Zane Caldwell	131	58	4/24–6/30	C

a. C = cattle, S = sheep, H = horse

This page left intentionally blank.

2.23. Recreation and Visitor Services

Special Recreation Management Areas

The RMP planning process provides for the identification of areas where recreation is the management focus. These SRMAs were traditionally areas that had higher recreation use or required extra recreation investment or where more intensive recreation management was needed. SRMAs are now areas where recreation is the predominant land use, and a commitment has been made to emphasize recreation by managing for specific recreation opportunities and settings on a sustained or enhanced, long-term basis. SRMAs must include a general description of important values as well as the general types of visitors to be served and opportunities provided. Objectives for SRMAs must describe intended activities and specific opportunities to be provided. Recreation setting characteristics (RSCs) depict the physical, social, and operational setting qualities to be maintained or enhanced. Subsequent implementing actions, as identified in the activity planning framework, are proactive in nature and address management, administration, information, and monitoring. The recognition of a singularly dominant activity-based recreation demand of and by itself (e.g., heavy OHV use and white water boating), however great, generally constitutes insufficient rationale for identifying new SRMAs.

The Upper Snake FOA currently has two SRMAs, the Snake River SRMA (21,475 pulic land acres), and the St. Anthony Sand Dunes SRMA (49,000 public land acres), which are shown in **Figure A-22, Appendix A–Maps**.

Extensive Recreation Management Areas

ERMAs are identified areas where recreation is planned for and actively managed on an interdisciplinary-basis in concert with other resources and resource uses. ERMAs include all public lands not identified as an SRMA or closed to public use. ERMAs offer recreation opportunities that facilitate the visitors' freedom to pursue a variety of outdoor recreation activities and attain a variety of outcomes. The majority of lands within the Upper Snake FOA are managed as an ERMA which is characterized by a diversity of natural resource settings and a range of recreation opportunities.

Because recreation is not the predominant management objective in ERMAs, management within all ERMAs is focused on implementation actions that address visitor health and safety, user conflict, resource protection issues, and maintaining appropriate activity participation. RSC attributes influence valued landscape characteristics and recreation opportunities contained in the ERMA.

The following section describes the general level of recreation use that is occurring throughout the Upper Snake FOA. The sections are broken out into current level of use/recreation demand/recreation supply and recreation management and administration. Motorized and non-motorized travel is discussed in **Section 2.24**, Comprehensive Travel and Transportation Management.

2.23.1. Current Level of Use/Recreation Demand/Recreation Supply

Public Land Visitors

The Upper Snake PA includes the St. Anthony Sand Dunes and South Fork of the Snake River, premier outdoor recreation destinations for motorized recreation and fishing opportunities in the nation. Recreation visitors to the Upper Snake FOA come from four primary sources: local, regional, and national and international locations. The BLM, in cooperation with University of Idaho, conducted a community assessment of the different communities within the Upper Snake PA in 2008 (McLaughlin

2008). This assessment helped the BLM gain a better understanding of how and where the public uses public lands. The BLM is conducting a recreation visitor study, in cooperation with University of Idaho, for high-use areas throughout the Upper Snake FOA. Demographic information and use patterns will be available at the end of 2009.

Surrounding Counties and Communities

According to data compiled by the U.S. Census Bureau for the period between 2000 and 2008 (U.S. Census Bureau 2008), Idaho is the fifth fastest-growing state in the United States, and an increasing number of people are living near or seeking to live near local public lands for a diversity of recreational opportunities. As a result of this growth, public lands administered by the BLM are absorbing increasing recreational demand and use. The Upper Snake FOA serves 12 southeast Idaho counties (and one Wyoming county); with Bonneville, Fremont, Jefferson, and Madison counties within close proximity to high-use recreation areas. **Table 2-36** presents population growth for the four counties.

Table 2-36. County growth comparison.

County	1990	2000	2007	Total Growth
Bonneville	72,207	82,522	96,740	24,533
Fremont	10,937	11,819	12,468	1,531
Jefferson	16,543	19,155	22,917	6,374
Madison	23,674	27,467	37,722	14,048

Census Data from Fremont County Comprehensive Plan (Fremont County Board of Commissioners 2008)

Outside of water-based and sand dunes-based recreation, which attracts visitation from across the region and nation, the greatest amount of public land recreation visitation occurs daily on public lands near communities. Many of the small communities within these counties have public lands bordering them that are used as recreation areas by local residents. This use continues to grow exponentially with the rapid growth in the communities themselves. This rapid growth combined with the enjoyment of open space is identified in Fremont County (Fremont County Board of Commissioners 2008), Jefferson County (Jefferson County Commissioners 2005) and City of Rexburg (Rexburg City Council 2008) comprehensive plans.

Regional Area

Visitors from the region and surrounding states come to the Upper Snake FOA because it is easy to travel to in a weekend, provides an abundance of recreation opportunities and settings, and offers two highly popular recreation areas (St. Anthony Sand Dunes and the South Fork of the Snake River).

National and International

Visitors come to the Upper Snake FOA from all over the U.S. and from international locations to visit the St. Anthony Sand Dunes and South Fork of the Snake River. The St. Anthony Sand Dunes SRMA is highlighted in numerous all-terrain vehicle (ATV) magazines and through ATV organizations. The Snake River SRMA is highlighted in numerous fly fishing magazines and by the eight permitted commercial fishing outfitters.

General Use Figures

Recreation use of public lands in the Upper Snake FOA is one of the predominant uses and continues to grow. The estimated use numbers are derived from road counters that are installed at the developed recreation sites, field observations, and professional judgment of the recreation staff. The Upper Snake FOA receives roughly 1,039,000 visitors each year.

The Caribou–Targhee (3M acres) and Salmon–Challis (4.3M acres) National Forests (NF) are adjacent to the Upper Snake FOA. These two forests collect information about visitor satisfaction and use. The two forests are highly desired destinations for hunting, fishing, white-water rafting and many other popular recreational pursuits. Included within the boundaries of the Salmon–Challis NF are 1.3M acres of the Frank Church–River of No Return Wilderness Area, the largest wilderness area in the Continental United States and the Wild and Scenic Salmon River and the Middle Fork of the Salmon River.

Recreation Activities

The Upper Snake FOA provides opportunities for a wide variety of outdoor recreation activities and related benefits. While the majority of recreation users participate in recreation activities in the Snake River and St. Anthony Sand Dunes SRMAs where there are numerous developed facilities, another large percentage of recreation users participate in dispersed recreation opportunities provided throughout the PA. Some of the typical recreational activities on public lands include, but are not limited to, boating and river-based recreation, camping, hiking, horseback riding, mountain biking, OHV use, and cross-country skiing. Migrating and resident wildlife provide plentiful opportunities for hunting, photography, and wildlife observation.

Since water-based and sand dune-based recreation activities account for a large and growing amount of visitation on BLM-administered public lands, the follow sections provide more detailed information on the types of activities and uses.

Water-Based Recreation

Snake River SRMA

The Snake River SRMA comprises the South Fork of the Snake River (Palisades Dam to the confluence with the Henry's Fork), Henry's Fork of the Snake River (St. Anthony to the confluence with the South Fork), and a portion of the main stem of the Snake River (confluence of South Fork and Henry's Fork to Lewisville Knolls). Throughout the Snake River SRMA, recreation activities and opportunities are very diverse and offer unique experiences and beneficial outcomes. Recreation activities vary and include fishing, boating, developed and undeveloped camping, hiking, hunting, mountain biking, motorized recreation, and bird watching.

The SRMA can be divided into five sections. The upper most section (15 mi of river), from Palisades Dam to Conant Valley runs through a narrow channel, then widens and flows around several island complexes and passes a waterfall upstream from the Swan Valley Bridge where Falls Creek cascades into the river. This section receives numerous visitors because of its scenic qualities and easy access. From Conant Valley to Byington boat access (26 mi of river), the river leaves U.S. Highway 26 and enters a scenic canyon. Vertical canyon walls hundreds of feet high plunge into the river and tall cottonwood trees grow on the islands and the banks. The impressive canyon scenery draws many day and overnight visitors. The canyon scenery continues downstream and near Byington the cliffs give way to level, but extremely dynamic, flood plain. From Byington to the confluence with the Henry's Fork (21 mi of river),

farmland flanks the corridor on both sides, but the river is sheltered by a cottonwood forest. This section receives less recreation use because of the difficulty of navigating this reach of the river. The next stretch is from the confluence with the Henry's Fork to the Mike Walker Boat Access (18 mi of river) and provides fishing and hunting opportunities. This stretch is primarily used in the fall and winter for waterfowl hunting. The final section is the Henry's Fork from St. Anthony to the confluence with the South Fork (approximately 21 mi of river). This river section is very different than the South Fork, as there is less volume of water and the river meanders through the flood plain more. The recreation use is limited due to the limited recreation developments, access to the river, limited water flows, and the recovering fishery. Currently, the primary recreation activities on the Henry's Fork are fishing, wildlife observation, hunting, sightseeing, picnicking, tubing and camping, among others.

The South Fork supports the largest riparian cottonwood gallery forest in the west (Merigliano 1996) and is among the most bio-diverse ecosystems in Idaho (Boccard 1980). The South Fork is home to 126 bird species, including 21 raptors (birds of prey), which resulted in its "National Important Bird Area" designation. The river supports the largest native cutthroat trout fishery outside of Yellowstone National Park. Because of these great resources, the Snake River SRMA from a recreation standpoint is a destination for regional, national, and international visitors. For example in 1997, the World Flyfishing Championships were held on the South Fork and every year a portion of the Jackson Hole One Fly Competition also is held on the South Fork. The native cutthroat trout fishery, excellent dry fly fishing, and a seasonal salmon fly hatch draw heavy angling attention to the Snake River SRMA. Fishermen travel from many states and abroad to fish the river.

Currently there are no permits required for private trips on any section of the South Fork, Henry's Fork and main stem of the Snake River. However, commercial use is regulated through the SRP process.

Teton River

The Teton River Canyon consists of the 5,804 acres of Bureau of Reclamation (BOR) lands and 3,496 acres of BLM-administered public lands located within the Teton Basin Project. These lands are located adjacent to and upstream of the Teton Dam Site in the Teton River Canyon and along the canyon rim.

Currently, access to the river canyon and its recreational opportunities is limited. Additionally, there are no developed recreation sites within the Teton River Canyon, only informal sites that are minimally maintained. As such, recreation activity and use levels are generally considered low, although several commercial outfitters do operate fishing/floating trips on the Teton River.

Planned recreational development at the time of Teton Dam construction consisted of day use, campground, and boat launch facilities, as well as improved public access to the Teton River Canyon. All planned recreation development would have been jointly financed by the BOR and the Idaho Department of Parks and Recreation (IDPR). Boat ramps at Spring Hollow river access and Teton Dam take-out sites were the only developed recreation facilities that were completed prior to failure of the dam. These boat ramps now serve as portions of the access roads to the river and are located on BOR lands. The two access points located on BLM-administered public lands is Bitch Creek and Felt Dam.

- Felt Power Plant—Accessed via Power Plant road, pedestrian access to the Teton River is possible, but limited by a locked road gate above the Felt Power Plant, and

- Bitch Creek Access—Accessed via State Route 32, a steep, user-defined pedestrian trail provides access to the river at this site.

Prior to construction of the Teton Dam, the Teton River fishery was categorized by IDFG as one of the finest in the state. The river provided opportunities for sport fishing primarily by float trip during the summer, although access to the river canyon was limited because of the steep canyon walls and lack of public roads to the canyon rim. No developed public recreation facilities were available in the river canyon prior to dam construction. The dam, resulting reservoir, and planned developed recreation facilities would have improved access to the area and created opportunities for flatwater-related recreation activities. It was estimated by the NPS and IDPR that recreation development along the Teton Reservoir would initially result in approximately 85,000 recreation days on an annual basis and rise to nearly 200,000 recreation days on an annual basis 40 years after construction of the dam. With the failure of the dam and its resulting impacts, recreation development and opportunities have been limited within this section of the PA.

Because of the lack of developed recreation facilities and difficultly associated with accessing the river, the Teton River Canyon offers a relatively primitive recreation setting in which to pursue several recreation activities. Currently, the primary recreation activities in the canyon are fishing, whitewater boating, wildlife observation, hunting, sightseeing, picnicking, and camping, among others. In general, residents of Idaho participate in many of these activities at a higher rate compared to national participation rates. Participation in many of these activities is also expected to increase over the next 15 years, especially in the Rocky Mountain Region, which includes Idaho.

Main Stem of the Snake River (Below Idaho Falls to American Falls Reservoir)
The main stem of the Snake River does not contain any developed recreation facilities on public lands. All of the recreation use is dispersed and public lands are accessed through state and county access points, private lands with permission, and public easements through private lands.

Willow Creek/Tex Creek
Dispersed recreation occurs throughout the Willow Creek/Tex Creek area. Access to public lands is limited because of the land status in this area. The majority of the recreation use occurs where county roads are adjacent to public lands (i.e., Kepps Crossing). A large amount of recreation use occurs in the fall during big game hunting season and during the winter for snowmobiling.

Henry's Lake
The lake provides for a world class trout fishery within its waters. The majority of public land administered by the BLM is located on the south and west shorelines of the lake. The majority of recreation use on the public lands is shore fishing, dispersed camping, wildlife viewing, and some winter snowmobile/cross-country use. BLM provides one of the five boating access locations along the lake, where BLM maintains a 1.5-mi gravel access road to a small gravel boat ramp. This access point can accommodate smaller boats that access the lake as well as well foot access along the south shore cliff area. Use at this semi-developed site was estimated at over 23,000 in 2008. Public lands on the west side of the lake can be accessed through Fremont County's Frome Park or the adjacent county road.

Sand Dunes Based Recreation

St. Anthony Sand Dunes SRMA

The St. Anthony Sand Dunes SRMA is a 49,000-acre area (approximately) that contains four active sand dune complexes within its boundary. These sand dunes are barchan dunes made of white quartz that vary from 50 to over 400 ft in height. The largest active dune complex of the four complexes has approximately 10,000 acres of active sand and receives the majority of recreation use. The SRMA is located 8 mi northwest of St. Anthony, Idaho, in the upper Snake River Plain. The SRMA was designated under the Medicine Lodge RMP and was created because of demands for specific structured recreation opportunities (activities, experiences, and benefits). The SRMA also provides a unique living environment for three species: the St. Anthony Dunes evening primrose, the pale evening-primrose, and the St. Anthony sand dune tiger beetle, which are managed through state-wide habitat conservation assessment and strategy plans. The SRMA and surrounding area also provides winter habitat for mule deer, moose, and the largest desert wintering elk population in North America. The majority of the SRMA is closed to human entry during the winter because of these winter wildlife populations. The SRMA management goal is to protect a unique environment and still provide a quality and safe recreation experience to the visiting public.

Recreation activities vary, with motorized recreation providing the majority of recreation use within the SRMA. Other activities include developed and undeveloped camping, hiking, big/upland game hunting, horse riding, antler hunting, wildlife viewing, mountain biking, and winter activities such as snowshoeing, cross-country skiing, and snowmobiling. The SRMA is a destination location for regional and national visitors seeking a quality motorized recreation experience.

The west side of the SRMA has two of the active dune complexes (the largest and the smallest). The west side of the SRMA is located on the west side of the Red Road, north of the Egin–Hamer Road, south of the Taylor/Grassy Ridge road, and west of the "Hook of the Sands" road. This west side has a 22,000-acre WSA within it as well as a portion of both the Nine Mile ACEC and the St. Anthony Sand Dunes RNA. The east side of the SRMA is located on the east side of the Red road and is adjacent to the Sand Creek WMA. These two active dune complexes have sand that is not attractive to motorized recreationists. The area does see some motorized recreation use mostly by big game/upland game hunters in the fall as well as antler hunters in the spring.

Use Figures

Table 2-37 presents visitation estimates for individual sites, and specific recreation areas within the two SRMAs. Estimates were derived from the Recreation Management Information System, a BLM recreation database. Many of the use numbers are derived from road counters that are installed at the developed recreation sites; dispersed recreation use numbers are derived from observation and professional judgment of the use patterns.

Dispersed recreational activities occur throughout the PA, but primarily center around dispersed camping and day use. Campsites are numerous within the FOA. **Table 2-38** presents visitation estimates for individual sites and specific recreation areas within the Upper Snake FOA.

Table 2-37. SRMA recreation visitation (fiscal year 2008).

Recreation Site	Annual Visitors
Snake River SRMA	
Byington Boat Access	45,581
Canyon Designated Camp Areas	1,696
Conant Boat Access	39,529
Cress Creek Trailhead	25,791
Heise Bridge Area	13,310
Hibbard Bridge Boat Access	2,095
Irwin Church Camp	908
Kelly Island Campground	2,941
Lewisville Knolls Area	940
Little Kelly Canyon Trailhead	10,628
Lorenzo Boat Access	32,616
North Menan Butte Trailhead	4,868
Outfitter Designated Camp Areas	308
Red Road Bridge Boat Access	2,129
Wolf Flats Camp Area/Boat Access	33,953
Total	217,293
St. Anthony Sand Dunes SRMA	
St. Anthony Sand Dunes	210,905
Egin Lakes Recreation Access	98,681
St. Anthony Dunes Red Road Access	55,940
Total	365,526

Source: BLM Recreation Management Information System, Upper Snake Field Office (2008)

Table 2-38. Dispersed recreation visitation (fiscal year 2008).

Area	Recreation Site	Annual Visitors
Medicine Lodge – Dispersed Recreation	Medicine Lodge	123,456
	Henry's Lake Boat Access	23,270
	Island Park Reservoir	200
	Kepps Crossing	2,200
	Medicine Lodge Creek (Lower)	450
	Medicine Lodge Creek (Upper)	175
	Patelzick Creek Primitive Camping	1,120

Area	Recreation Site	Annual Visitors
Big Butte – Dispersed Recreation	Dispersed–Big Butte	166,699
	Firth River Bottoms	3,025
	Twenty Mile Trailhead	10,850
Birch Creek/Lost Valleys	Birch Creek Campground	34,271
	Clyde Administrative Site	250
	Birch Creek/Lost Valleys–Dispersed	44,174
	Pass Creek Campground	2,775
Big Desert	Big Southern Butte	2,210
	Dispersed– Big Desert	41,710
Total		456,835

Source: BLM Recreation Management Information System, Upper Snake Field Office (2008)

2.23.1.1. Recreation Management and Administration

Site-Specific Management for Specific Reaches of the Snake River

It is recognized that resources, resource uses, and management issues differ in some reaches of the Snake River. Therefore, different classes were considered appropriate for three sections of the Snake River (BLM 2008f). The site-specific management (SSM) classes for the main stem of the Snake River (confluence of South Fork and Henry's Fork of the Snake River to Lewisville Knolls), South Fork (Palisades Dam to the confluence of the Henry's Fork), and Henry's Fork (St. Anthony to the confluence of the South Fork) are based on the VRM classes and the recreation opportunity spectrum (ROS) as identified in the Snake River Activity/Operations Plan EA (BLM 2008f). These three classes allow for the development of flexible management strategies to address the unique needs of these areas.

Using the SSM definitions, presented in **Table 2-39**, the rivers were organized into three classes (I, II, and III). The definitions in **Table 2-39** generally describe what activities and conditions are acceptable for each class.

Table 2-39. SSM class definitions.

Criteria Category	SSM Class I	SSM Class II	SSM Class III
Physical Setting	Unmodified natural environment. Evidence of human activities would be unnoticed by an observer. Evidence of non-motorized and one motorized trail is acceptable, but should not exceed standard to carry expected use. Structures are extremely rare. Free of overhead power lines or cables,	Natural setting may have subtle modifications that would be noticed but not draw the attention of an observer. Little or no evidence of roads. Motorized use of trails and roads is acceptable. Structures are rare and isolated.	Natural setting may have modifications which range from being easily noticed to dominant to observers within the area. There is strong evidence of designed roads and or highways. Structures are generally scattered and some are noticed by sensitive

Criteria Category	SSM Class I	SSM Class II	SSM Class III
	except where they currently exist.		travel route observers. Structures may include power lines, microwave installations, etc.
Water Resources Development	Free of impoundments. Low dams, diversions, or other modifications are absent, except the existing Reid Canal Diversion.	Free of impoundments. Some irrigation diversions, riprap or other modifications may be present and are maintained in a natural and riverine appearance.	Some existing impoundments or diversions. The existence of diversions or other modifications remain generally natural and riverine in appearance. Existing diversions, impoundments, and rip rap may be maintained or improved according to agencies' standards and guides.
Shoreline Development	Essentially primitive. Little or no evidence of human activity. The presence of a few inconspicuous structures is acceptable, including levees to protect private land.	Largely undeveloped. No substantial evidence of human activity. The presence of dispersed structures is acceptable.	Some development. Evidence of human activity. The presence of residential development and a few commercial structures is acceptable. Lands may have been developed for a range of uses.
Accessibility	Generally inaccessible except by trail and boat. No roads, railroads, or other provision for vehicular travel within the river area.	Accessible in places by low standard gravel roads and boats. A road may parallel one side of the river but remain substantially unnoticed.	Readily accessible by road, railroad, and boats. The existence of parallel roads or railroads on one or both banks as well as bridge crossings and other river access points is acceptable.
Social Setting	On an annual basis, infrequent to low contact frequency on the land. Peak season use may exceed limits established.	On an annual basis, low to moderate contact frequency on the land. Peak season use may exceed limits established.	On an annual basis, frequency of contact is moderate to high on the land. Peak season use may exceed limits established.

Criteria Category	SSM Class I	SSM Class II	SSM Class III
Managerial	On-site regimentation is low with controls primarily off-site. Controls can be physical, such as barriers, or regulatory, such as permits.	On-site regimentation and controls present but subtle. Controls can be physical, such as barriers, or regulatory, such as permits.	On-site regimentation and controls are noticeable, but harmonize with the natural environment. Controls can be physical or regulatory.

Thus, the Main Snake, South Fork, and Henry's Fork are divided into three SSM classes, totaling nine SSM class segments as shown in **Table 2-40** and on **Figure A-23, Appendix A–Maps**. The SSM classes provide guidelines and boundaries for how the different classes are managed for facility development, recreation opportunities, and other resource uses. Overall, Class I areas are managed to maintain an unmodified natural environment, Class III areas are managed to provide a greater modification of the natural environment, and Class II areas are managed for an intermediate level of modification to the natural environment. Class I management applies to 25 mi (river), Class II applies to 51 mi, and Class III applies to 43 mi.

Table 2-40. Description of SSM class segments within specific reaches of the Snake River.

River Segment		SSM Class of Segment	Miles in Segment
Map[a] Locator	Description		
1	Palisades Dam to Irwin Powerline	III	9
2	Irwin Powerline to Conant Boat Access	II	8
3	Conant Boat Access through Lufkin Bottom	I	11
4	Lufkin Bottom to Riley Diversion	II	12
5	Riley Diversion to 0.25 mi downstream from Twin Bridges	III	11
6	From 0.25 mi downstream from Twin Bridges to the confluence with the Henry's Fork (excluding Lorenzo Bridge area)	I	14
7	Lorenzo Bridge, 0.25 mi each side Beaver Dick Park, 0.25 mi each side Hibbard Bridge, 0.25 mi each side Red Road Bridge, 0.25 mi each side	III	2
8	Confluence with the Henry's Fork Upstream to St. Anthony	II	31
9	From the confluence downstream to Market Lake Canal (Lewisville Knolls)	III	21

a. Figure A-23, Appendix A–Maps

Developed Recreation Facilities

Developed recreation sites and facilities have been constructed to enhance recreation opportunities, protect resources, manage recreation activities, or reduce recreation user conflicts. These infrastructure developments range from campgrounds to boat access sites to trailheads with simple bulletin boards or interpretive signs.

The BLM continues to upgrade recreation facilities as funding becomes available, but many are still in need of renovation. In addition, any need for additional facilities is overshadowed by a shortfall in maintenance and rehabilitation funds for existing facilities and the high cost of construction. Developed recreation sites are maintained by BLM staff.

Snake River SRMA

The BLM offers numerous developed recreation sites along the South Fork corridor. BLM maintains the Conant, Byington, and Lorenzo boat access sites, which are heavily used by both outfitters and the general public. The 14-unit Kelly's Island campground, located near Heise Hot Springs Resort, provides recreation opportunities only 30 minutes from Idaho Falls.

Three trails located along the South Fork and Henry's Fork are maintained by BLM. They are the Cress Creek Nature and Stinking Springs trails, near Heise, and the North Menan Butte trail near the confluence of the South and Henry's Forks of the Snake River.

Eleven designated camp areas currently exist in the South Fork Canyon, additional areas are identified to be designated in the future (BLM 2008f). These areas are full most weekends and holidays during the months of July and August. During some holidays, the designated camp areas are full and visitors are utilizing non-designated areas to camp. Visitors may not be aware that there are numerous campsites (delineated by an existing fire ring) within a particular area because only the area itself is identified with a sign. Visitors are required to have a portable toilet portable toilet, fire plan, and self-issue permit for camping in the South Fork Canyon. **Table 2-41** illustrates the camping use in the South Fork Canyon based on self-issue permits.

Table 2-41. Self-issue permit statistics for the South Fork Canyon for 1995–2008.

Year	Number of Permits[a]	Number of People	Average Group Size
1995	208	787	3.79
1996	213	839	3.93
1997	155	564	3.64
1998	270	987	3.66
1999	289	1,051	3.63
2000	325	1,291	3.97
2001	379	1,377	3.63
2002	–	1,015	–
2003	327	1,350	4.13
2004	341	1,272	3.73

	Number of Permits[a]	Number of People	Average Group Size
2005	334	1,286	3.85
2006	404	1,509	3.74
2007	446	1,808	4.05
2008	446	1,696	3.80
Total	4,137	16,832	–

a. There is not 100% compliance with visitors filling out the self-issue permit for camping in the South Fork Canyon. The numbers identified in the table are an approximation of the actual overnight use.

St. Anthony Sand Dunes SRMA

There are two developed sites within the SRMA. One is the 20-acre Egin Lakes Recreation Area that has three large day-use parking areas as well as a 48-unit group campsite. This development is located 10 mi west of St. Anthony on the south end of the largest dune complex. It is the main access to the dunes and received over 80,000 visitors in 2008. The other developed site is located adjacent to the Red Road, which splits the SRMA in half. This area has a 2-acre red cinder day-use parking area, numerous semi-developed camp areas, and a designated campfire use area that received over 56,000 visitors in 2008.

Birch Creek/Lost Valleys

Within the Birch Creek Valley there are two developed sites. One is the Birch Creek Recreation Area, a 500-acre site located along 5.5 mi of Birch Creek. The area is located between U.S. Highway 28 and Birch Creek, 3 mi south of Lone Pine. This site has 25 developed campsites and over 75 undeveloped sites within its boundary. The site has potable water, a maintained road system, numerous kiosks, an information bulletin board, and numerous permanent vault restrooms. The site received over 38,000 visitors in 2007. The other developed site is Pass Creek Campground/Trailhead located 5 mi west of U.S. Highway 28 and 7 mi from Lone Pine. This site has a 2-unit campsite and semi-developed trailhead. This trailhead provides access to a maintained multiple-use trail that starts on BLM-administered public lands and ends on the NFSL that leads toward Diamond Peak and Pass Creek Lake. The site received 3,600 visitors in 2007.

Henry's Lake

Henry's Lake Boat Access has a 1.5-mi maintained road system to a gravel-based boat ramp. Two (2) miles of buck and pole fencing and numerous signs/bulletin boards make up this boat access to Henry's Lake. The site is located 15 mi northwest of Island Park. The site received over 19,000 visitors in 2007.

Hell's Half Acre

Hell's Half Acre is designated as a National Natural Landmark (NNL) and a WSA. Hell's Half Acre is a lava flow located approximately 20 mi southwest of Idaho Falls and 5 mi east of Blackfoot, Idaho. U.S. Interstate 15 bisects the lava flow and there are two rest areas, one on each side of the division. The Hell's Half Acre trails are accessed via north and southbound Interstate-15 rest area exits.

The two developed trails are found on the west (southbound interstate) side of the lava field. These partly handicap-accessible trails have a concrete surface and were designed as self-guided interpretive trails

through the lava flow. Both trails are used for environmental education by area schools and other organizations, as well as the driving public. The trails received over 100,000 visitors in 2007.

These undeveloped trails offer scenic solitude. The trailhead is a 2-acre gravel parking area with kiosk, picnic shelter and provides access to two primitive trails. One is a 0.5-mi loop trail and the other is a 5-mi trail that continues from the loop trail out to the lava flow's most recent vent area. Both trails are identified by intermittent trail poles (10-ft poles, with painted tops) placed within the lava cracks along the extent of the trail. School groups use the shorter loop trail in the spring for environmental education tours, while the longer trail to the vent area is used by individuals and Boy Scout groups for endurance hiking. Around 16,000 visitors used the trailhead in 2007.

Big Southern Butte

Big Southern Butte is the largest and youngest (300,000 years old) of three rhyolitic domes formed over 1M years ago and located near the center of the ESRP. Development on Big Southern Butte is limited to a 5.5-mi access road to a parking lot for hang gliding use and an old fire lookout at the summit of the butte. Big Southern Butte is estimated to receive over 2,200 visitors annually, generally occurring from the end of May through November.

Special Recreation Permits

There are five types of uses for which special recreation permits (SRPs) may be authorized: commercial use, competitive use, vending, special area use, and organized group activity and event use (43 CFR II § 2930 et seq.). Most SRPs issued by the Upper Snake FO are related to river and upland hunting outfitting or horse trail rides.

The BLM and USFS have an MOU with the Idaho Outfitters and Guides Licensing Board (IOGLB). This MOU provides procedures and guidance for coordination and cooperation among the federal agencies and IOGLB on issues involving the administration and operation of outfitters and guides on the NFSL and BLM-administered public lands. The objective of the MOU is to establish an administrative framework for the purpose of coordinating respective permit and license procedures between the USFS, BLM, and the IOGLB. The IOGLB has set the number of licenses issued for outfitting and guiding on rivers and for hunting in the Upper Snake FOA. The Upper Snake FO works cooperatively with IOGLB to permit the same number of outfitters licensed by the state throughout the FOA. Changes to allocation of licensed outfitters must be coordinated with the IOGLB.

South Fork

The BLM and USFS jointly permit seven commercial fishing outfitters (through eight permits, four permits issued by BLM and four permits issued by the USFS) on the South Fork. The South Fork is divided into four sections based on IOGLB rules and statutes. Six of the seven fishing outfitters on the South Fork have reserved outfitter camps in the South Fork Canyon. Outfitters and guides are governed by their State of Idaho license and federal permit. **Table 2-42** presents the commercial outfitter use restrictions for the South Fork river sections.

Table 2-42. Commercial fishing outfitters use restrictions for the PA.

River Section	Number of Boats
Dam—Swan Valley Bridge	No more than four boats/outfitter/one time
Swan Valley Bridge—Black Canyon	No more than four boats/outfitter/one time
Black Canyon—Byington	No more than four boats/outfitter/one time
Byington—Confluence	No more than four boats/outfitter/one time

Source: State of Idaho Outfitters and Guides Licensing Board

Henry's Fork and Main Stem of the Snake River
The BLM permits three commercial fishing outfitters on the Henry's Fork and three commercial fishing outfitters on the main stem of the Snake River.

Teton River
BLM, in cooperation with the BOR, has issued five SRPs to outfit and guide on the river on both BLM and BOR-administered public lands. These are 1-year permits that can be rolled into 5-year permits. The permits allow outfitted float fishing trips on the river from Harrops Bridge to the Teton River and Henry's Fork of the Snake River. Other than the outfitted fishing trips, little other guided use takes place on or along the Teton River.

Rest of the Upper Snake FO
The Upper Snake FO currently issues two permits for big game hunting, three permits for trail rides, and one permit for vending. Annually one to two different groups are issued SRPs to conduct competitive events, and approximately six groups are issued SRPs for organized group activities. Overall, there has been an increased demand for SRPs for the FOA.

The Upper Snake FO also receives numerous requests (e.g., National Outdoor Leadership School, BYU–Idaho, City of Rexburg) for SRPs for commercial activity. These requests are dealt with on a case-by-case basis each year.

The Upper Snake FO collects approximately $35,000–40,000 each year in SRP fees. The revenue is expended in program administration, visitor services, monitoring and maintenance.

2.23.1.2. Fee Program and Cooperative Management

The Omnibus Consolidated Rescissions and Appropriation Act of 1996 (P.L. 104–134, as amended) directed the BLM to develop and implement a pilot recreation fee demonstration program to determine the feasibility of cost recovery for operation and maintenance of recreation areas and sites. The BLM initially approved 17 demonstration projects, including one in the FOA, the South Fork of the Snake River. The legislation also gave the BLM the authority to retain fees collected at recreation sites: the Egin Lakes Access Recreation Site at the St. Anthony Sand Dunes and Birch Creek Campground. The three fee programs now operate under the Federal Lands Recreation Enhancement Act (P.L. 108–447, 2004).

South Fork of the Snake River

The South Fork fee area has ten developed boat access sites under the program, and management of the ten sites is shared among the BLM, the USFS, the IDFG, and Bonneville, Jefferson, and Madison Counties. Because of this mixed-management, a working group was established composed of a representative from each agency and county. The group manages the basic structure, and distribution, of funds received through the fee system. Regardless of which jurisdictional entity collects funds, the working group comes to consensus on how and where the funds are to be spent within the corridor. Fees are collected from May 24 through September 30 of each year. The working group meets once a year to determine project funding for the coming year. Fees collected from 1997 to 2008 are shown in **Table 2-43**.

Table 2-43. Fee revenues for the South Fork 1997–2008.

Year	Fees Collected ($)	Fiscal Year	Fees Collected ($)
1997	14,001	2003	35,458
1998	27,961	2004	34,392
1999	30,469	2005	37,348
2000	36,401	2006	40,493
2001	38,279	2007	44,698
2002	37,991	2008	49,485
Total			426,976

St. Anthony Sand Dunes

From 1997–2003, fees for the use of the Egin Lakes Access Recreation Site at the St. Anthony Sand Dunes were voluntary and donated from recreation users of the site. These fees averaged less than $2,000 annually. In 2004, after major campground improvements were made at the site, a permanent campsite fee was established. There has been a steady increase in annual fee collections since the fee program has been in place.

Collected fees are used for the operation and management of the recreation site and the sand dune complex within the St. Anthony Sand Dunes SRMA. The fees also assist Fremont County for law enforcement and emergency medical system support and IDFG for wildlife habitat management support. Fees collected from the campground from 1997–2008 are shown in **Table 2-44**.

Birch Creek Campground

Upper Snake FO collects volunteer fees for camping at the semi-developed Birch Creek Campground area/site. The fees average less than $1,000 annually, which supplements the operational costs of the campground.

Table 2-44. Fee revenues for Egin Lakes access recreation site 1997–2008.

Year	Fees Collected ($)	Fiscal Year	Fees Collected[b] ($)
1997[a]	< 1,000	2003[a]	1,827
1998[a]	< 1,000	2004	19,227
1999[a]	< 1,000	2005	51,522
2000[a]	< 1,000	2006	75,302
2001[a]	< 1,500	2007	84,012
2002[a]	< 1,500	2008	102,843
Total			334,733

a. Voluntary program year

b. Approximated

2.23.1.3. OHVs

The Upper Snake FOA has outstanding opportunities for OHV recreation on existing roads and trails. OHV designations were established in the Medicine Lodge RMP and Big Desert MFP. Designations were never completed in the Big Lost and Little Lost–Birch Creek MFPs. Discretionary closures are made in emergency situations, such as imminent resource damage, and areas within WSAs are limited to existing routes. See **Section 2.24**, Comprehensive Travel and Transportation Management, for additional information about OHV use.

2.23.1.4. Interpretation/Environmental Education

The Eastern Idaho Visitor Information Center (EIVIC) is operated jointly by the BLM, the USFS, and the Greater Idaho Falls Chamber of Commerce. The primary purpose of the EIVIC is to provide a location to obtain one-stop informational materials for residents of the Greater Idaho Falls area, as well as for tourists traveling through eastern Idaho. The EIVIC is the primary dissemination point for maps; thus, allowing visitors to come to one location for all their map needs, including city, county, state, BLM, USGS, and USFS maps.

EIVIC staff educates the public about Idaho Falls community activities, organizations, and about the state of Idaho. The staff also educates the public about recreational activities and opportunities to access and use public lands (BLM and USFS), including information about the laws and regulations that govern these activities and uses. These actions help the BLM and USFS manage and protect public lands and their natural and cultural resources for the benefit and enjoyment of public land visitors and users. The EIVIC received 31,687 visitors to the center in 2007 based on a counter that is installed at the entrance door of the facility.

Upper Snake FO staff are also involved with providing environmental education programs for the local community. In 2008, BLM staff provided numerous programs for schools, scouts, members of the community, local educators, and others. They reached out to 4,955 members of the public about tree physiology, fire prevention, Leave No Trace, wildfires, plants, wildlife and numerous other resources found on public lands.

2.23.2. Forecast

Recreation use in the Upper Snake FOA is expected to increase as a result of a combination of social and environmental conditions (e.g., more people moving to the area and recreating more on public lands) in Idaho and neighboring states. Without active management, natural resource conditions and the quality of the recreation experience could decline with increased recreation use.

SRMAs

The two SRMAs, South Fork SRMA and St. Anthony Sand Dunes SRMA, will continue to draw recreation visitors to this region. Increased advertising and marketing for these popular destinations, as well as indirect promotion (e.g., being rated as a "top" destination by national OHV publications) the areas receive, and may continue to receive, will contribute to further increases in recreation use.

The majestic Snake River is the lifeblood of the eastern Idaho region. Besides providing irrigation for millions of acres of agricultural land, the river is also an international draw for recreational opportunities, which provides an inflow of cash to local economies. The river is also a haven for dozens of bird, fish, and big game species, in part because of one of the largest cottonwood gallery forests in the western United States.

River use varies with river flow and seasonal salmon fly and other insect hatches. Because of changes in fishing regulations, the river's proximity to local communities, and the popularity of the Snake River SRMA, visitation occurs year-round with the most intense use in the months of July and August. The Snake River SRMA has experienced anywhere from a 8 to 11-fold increase in use over the last 20 years based on Upper Snake FO visitor use data.

Special designations, unique qualities, and different types of activity areas (e.g., trail systems, day-use areas, camping areas, wildlife management areas, and vegetation management areas) exist in the Snake River and St. Anthony Sand Dunes SRMAs. All of these resources draw many recreation visitors to the areas.

An economic study was conducted in 2005 for the Upper Snake River region by Dr. John Loomis, Colorado State University. In this study the current jobs and income associated with the Henry's Fork (entire segment, Henry's Lake to confluence with the South Fork) was $29M and current jobs and income associated with the South Fork was $12M.

Undeveloped/Dispersed Recreation

Recreation use in the FOA, based on the BLM's Recreation Management Information System, is estimated to increase an average of 5% each year. The anticipated increase in use is based on a number of factors as follows:

- increase in the population of Idaho and surrounding states,
- displacement from other recreation areas due to loss of opportunity or change in management (e.g., regulations and crowding in California),
- increase in leisure time and disposable income for the working population,
- increasingly active retired population with more disposable income,

- rapidly evolving forms of recreation and new vehicles for pursuing recreation activities,
- increasingly important natural resource-based recreation, as our population becomes increasingly urbanized,
- increasing importance of recreation as a component of the local and regional economic base, surpassing traditional industries in many areas, and
- increasing popularity of outdoor recreation as a family-oriented activity.

These factors taken together are expected to increase recreation usage and demands on natural resources. According to Idaho's 2006–2010 Statewide Comprehensive Outdoor Recreation Plan (IDPR 2006), Idahoans cited camping, fishing, visiting parks, hiking, and biking as the five outdoor recreation pursuits most needed outside of their local communities. There is also an increased demand for developed facilities, including campgrounds, trails, and interpretive and education opportunities.

Special Recreation Permits

The demand for SRPs is likely to come from big game outfitters, existing commercial fishing outfitters and guides, as well as from other companies wanting to offer fishing trips or different recreation opportunities (e.g., scenic float, ropes courses, photography). Presently, SRPs (except for commercial fishing outfitters) are authorized on a case-by-case basis.

The Upper Snake FO anticipates increased demand from, but not limited to, non-profit or educational groups and other organizations; sanctioned or structured competitive events; vending in association with a permitted event; and group outdoor recreation activities or events which are neither commercial nor competitive. Other uses such as commercial filming permits also need to be considered.

2.23.3. Key Features

Some of the most popular features in the Upper Snake FOA are the St. Anthony Sand Dunes and Snake River SRMAs. There are numerous opportunities for recreation in these two SRMAs along with an abundance of developed facilities. The St. Anthony Sand Dunes SRMA provides many opportunities for motorized recreation and the Snake River SRMA provides many opportunities associated with water resources.

Other features that attract visitors include areas with high game populations, opportunities for motorized recreation, and opportunities to hike on trails. The main stem of the Snake River, Henry's Fork, and the Teton River are three major rivers that flow through the Upper Snake PA. There are numerous opportunities for recreation along these river corridors. The recreation use on these river segments is increasing because of increased, dispersed recreation opportunities and growth in the communities surrounding the rivers.

Within the Birch Creek Valley, historic site touring is on the increase by recreationists using OHVs and has become a major recreation activity on BLM as well as USFS-administrated public lands. The viewing of old cabins, mine shafts/adits, and ore loaders, as well as locating the corridor of the NPNHT has become a popular recreation activity. In the last 5 years, just this particular recreation use has increased over 5% annually in the valley.

The Big Desert attracts recreation users for scenic and wildlife viewing by vehicle, lava flow exploring (Hell's Half Acre and Cedar Butte lava fields), and hang gliding (off the top of Big Southern Butte).

The Box Canyon area on the south end of the Lemhi mountain range near Howe provides rock climbing opportunities and Native American pictograph viewing.

Coyote Butte, in the Lost River mountain range on the Big Lost Valley side, attracts hang gliders to use its launch site when winds are not optimal to use the King Mountain hang glider launch site.

Viewing and hiking portions of remnants of the Jeffry–Goodale Cutoff and McTucker Road trails in the Big Desert area and the Continental Divide Scenic Trail near Monida Pass are also key features for recreation users within the PA.

This page left intentionally blank.

2.24. Comprehensive Travel and Transportation Management

2.24.1. Current Level

Roads and trails within the FOA serve a wide variety of transportation needs, providing access to ranchers, forest and mining industry interests, recreationists, researchers, administrators, and others. The Upper Snake FO transportation system, as identified currently in BLM's Facility Asset Management System (FAMS), consists of approximately 880 road segments over approximately 3,500 mi of roads. The Upper Snake FOA has about 24 mi of trails for motorized, pedestrian, and equestrian uses. Experience has shown that there are likely many more miles of primitive roads on public lands that are user-created rather than engineered. These roads are in the process of being inventoried and mapped, and decisions need to be made to include them in the BLM system or close them to future use. To date, the Upper Snake FO has completed an inventory of roads and trails on about 830,000 acres, or about 46% of the Upper Snake FOA.

Major roads crossing public lands within the Upper Snake FOA include U.S. Interstate 15 and Highways 20 and 26, several major state highways, and an indeterminate number of paved and graveled county roads. Numerous county-improved gravel roads cross public lands or tie into the BLM system, primarily for industrial or residential use and access. The BLM road system has a significant number of developed and primitive roads that the agency either maintains or for which it has custodial responsibility.

While the BLM transportation network serves a very broad variety of users, perhaps the greatest numbers of users come from those using BLM roads and trails for purely recreational purposes (as described in **Section 2.23**, Recreation and Visitor Services). Such activities can include recreational riding, hunting, fishing, following the routes of historic trails and roads (e.g. Jeffrey-Goodale Cutoff and NPNHT), or other activities. Various routes of these historic trails are incorporated in the FO's transportation system.

The same network is also being used for wildlife research and monitoring, grazing management, maintaining range improvements, forestry study and extraction, and mining. Because of the exponential growth in the utilization of OHVs on public lands in the past several years, BLM has established guidance for creating management zones (i.e., travel management areas, [TMAs]) to manage OHV use. TMAs may be created in areas where recreational use is especially focused or heavy, or where other resources are present that need to be protected from possible damage by OHVs (e.g., unauthorized hill climbs and related erosion and visual quality problems). At present there are no established TMAs to provide guidance for areas of substantial OHV use.

While no TMAs exist at present, there have been decisions in the past two decades that affect travel on public lands. Seasonal closures exist for several areas within the Upper Snake FOA to protect wintering wildlife. The decision record for the Snake River Activity/Operations Plan EA (BLM 2008g) also has specific guidance for OHV use. Currently, no specific management exists for regulation of over-snow vehicles except for the Stinking Springs area. The creation of TMAs would help the Upper Snake FO manage areas of current and future OHV use in concert with other authorized uses on public lands.

Recommendations for road management and maintenance are scattered throughout the Upper Snake FO's current management guidance. Guidance needs to be carried forward and updated during the the Upper Snake FO RMP planning effort to allow for such uses as maintenance of range improvements, access to wildlife and other research study sites, access to private lands, access to mining claims, and other

appropriate administrative access needs as determined by the authorized officer for the Upper Snake FO. Specific recommendations for administration of OHV roads and trails are generally found in the recreation sections of the FO's exisitng LUPs. However, these LUPs did not address the area designations that are required in today's RMPs (with the exception of some WSAs, ACECs, and RNAs, which generally limited travel to existing roads and trails); as a result, many areas remain undesignated. The Medicine Lodge RMP does address areas that are open, closed, and limited to OHV use; however, given the popularity and technological advances of ATVs, utility terrain vehicle (UTVs) and other motor vehicles, these areas should be reevaluated for current BLM guidance and direction. Since the Upper Snake FO's LUPs were implemented, the BLM has also instituted various seasonal closures that include travel restrictions, which also need to be considered at the landscape level. Also, in recent years, there have been other opportunities for organized OHV use, which decisions have been officially deferred until the completion of a new RMP. These opportunities included a proposal in the early 2000s by the IDPR to create a Lost River Trail system in the Big and Little Lost River valleys, and increasing interest on the part of rock-crawling groups to create trails near North Menan Butte and the south end of Hell's Half Acre. These opportunities are discussed in more detail in Chapter 3, Current Management Current Management Direction and Management Opportunities.

The BLM Land Use Planning Handbook (BLM 2005a) requires classification of public lands as open, closed, or limited to motorized travel activities. Open use would allow for areas of unfettered motorized travel, regardless of existing roads or trails. Closed areas are closed to motorized travel activities. Limited areas may have various meanings: limited to types or modes of travel, such as foot, equestrian, bicycle, motorized; limited to existing roads and trails; limited to designated trails, closed at certain times of the day or season of the year, or for other reasons. Public lands that have not been designated are generally managed as open areas. **Table 2-45** presents estimated acreages of lands in the Upper Snake FOA that have been designated under one of these classifications.

Table 2-45. Upper Snake FOA motorized travel designations.

Area OHV Designations	Acres[a]
Open/Undesignated	1,343,109
Limited	448,824
Closed	19,067

a. Actual designated acres may vary

2.24.2. Forecast

According to data compiled by the U.S. Census Bureau for the period between 2000 and 2008 (U.S. Census Bureau 2008), Idaho is the fifth fastest-growing state in the United States, having grown an estimated 17.8% since the 2000 Census. Recreational road and trail use is also on the rise. A 2004 IDPR Survey (IDPR 2006) found that 59.4% of respondents participated in hiking, 36.8% participated in four-wheel driving, 33.7% participated in ATV riding, 25.3% participated in mountain biking, 16.2% participated in horseback riding, and 14% participated in motorcycle riding. The participation for each of these activities varies throughout the state depending on the proximity of the recreational opportunity to the user. IDPR also compiled statistics of motorbike and ATV registrations over the same 6-year period, including the 2000 and 2006 seasons, and found that registrations in the counties generally containing the

Upper Snake FO grew by 95.4% (compared with statewide growth of 66.1% over the same period, IDPR 2007). These statistics translate to an expectation that ATV and other OHV recreation is expected to rise in eastern Idaho, possibly outpacing the statewide average for many years to come. As the "Baby Boom" generation ages, BLM can also expect to see an increase in trail use with ATVs and UTVs over other traditional recreational uses, such as hiking and horseback riding.

2.24.3. Key Features

The BLM transportation system has a considerable number of developed and primitive roads that the agency either maintains or has custodial responsibility. Maintenance responsibilities for all of these roads are the responsibility of BLM, other agencies and individuals, or a combination. **Table 2-46** presents the parties responsible for maintenance and the associated number of road miles across the Upper Snake FOA transportation system.

Table 2-46. BLM system roads shown by maintenance responsibility.

Maintenance Responsibility	Road (miles)
BLM	2,204
BLM/Other Agency	1,120
BLM/Private Individual	2
Other Agency	212
Total	3,538

BLM system roads, in general, each have assigned maintenance levels ranging from 1 to 5, with 1 being the least level of maintenance and 5 requiring the most.[8] The vast majority of roads in the Upper Snake FOA are primitive roads, which are maintained at either Level 2 or 3 (custodial maintenance only). The breakdown of system roads by maintenance levels is shown in **Table 2-47**.

Table 2-47. BLM system roads shown by maintenance level.

Maintenance Level (ML)	Road (miles)	Percentage of Total
ML-2	3,110	88
ML-3	323	9
ML-4	83	2
ML-5	21	< 1
Total	3,537	100

CTTM considers a wide range of transportation methods and needs, largely concentrating on motorized and non-motorized needs. However, CTTM also considers other uses beyond over-land motorized vehicles, including pedestrian and equestrian, over-water, over-snow, and air travel needs. The navigable

[8] During Fiscal Year 2008, the BLM in Idaho moved to a three-level description of its transportation system; travel routes and ways will be described in future reports and plans as roads, primitive roads, or trails. However, the automated FAMS data, as of this writing, has not yet made the transition to the three-level system, but instead remains a 1 to 5 system for purposes of administration.

rivers found within the Upper Snake FOA are primarily used for recreation. At present, there are no licensed outfitters for winter activities, nor are there groomed (e.g., snowmobile, Sno-Cat) over-snow trails within the Upper Snake FOA. Also within the Upper Snake FOA there are two airstrips located on public lands in the Big Desert immediately south of the INL: one near Quaking Aspen Butte and another near Big Southern Butte, which is also partially located on private land. The airstrips have been leased to the Idaho Transportation Department's Division of Aeronautics, and the leases are valid through 2012. Regarding motorized and non-motorized trails, the Upper Snake FOA has a mix of trails, at varying levels of development. **Table 2-49** describes these trails.

Table 2-48. Upper Snake FO motorized trails.

Trail Name	Length (miles)	Development/Characteristics
Stinking Springs	2	Stinking Springs motorized trail is open to all recreation visitors using motorized and non-motorized means of transportation. This trail is mainly used by ATVs and is 2 mi in length. There are no interpretive signs and the trail connects to the USFS trail system. In the future the trailhead will include a vault toilet and an interpretive kiosk.
Continental Divide National Scenic Trail	5	This trail is maintained as a county road. Directional signs are maintained by the BLM.
Pass Creek	0.5	This trail has a register box at the trailhead. There are no interpretive signs and the trail is maintained by an IDPR trail crew on an annual basis.
St. Anthony Sand Dunes	19	Three motorized trails across the St. Anthony Sand Dunes are signed with moveable markers, and a dunes technician monitors them daily. Law enforcement patrols also educate about and enforce trail riding. The trails originate from the Egin Lakes Campground. Two trails proceed west to near the Western edge of the Dunes, and the third trail proceeds east from Egin Lakes to the Desert Oasis Resort and Sand Hills Resort. Because of the inherent variable nature of sand dunes, the exact route of the trail may change from time to time. The markers exist to help steer riders away from hazards, and riders are cautioned to ride responsibly.

Table 2-49. Upper Snake FO non-motorized trails.

Trail Name	Length (miles)	Development/Characteristics
Cress Creek	1.9	An interpretive trail with 18 educational signs. This trail is paved and accessible for 0.4 mi and the remaining loop is over 1.5 mi of graveled trail. The trailhead includes parking and a vault toilet. In 2005, the trail was designated as a National Recreational Trail.
Stinking Springs	2	The Stinking Springs single-track trail is presently under construction. When finished, it will total 2 mi and would connect to the Stinking Springs motorized trail.

Trail Name	Length (miles)	Development/Characteristics
Little Kelly	1	Little Kelly Trail totals 1 mi and connects with the USFS trail system. There are no interpretive signs and the trailhead includes undeveloped sites to camp.
North Menan Butte	2	North Menan Butte includes 2 mi of trails on the west, south, around, and through the crater. The west side trail has a paved parking area with interpretive kiosk and a vault toilet. Future plans call for a network of interpretive signs (about 14) that will be installed on the west side trail and around the crater.
Hell's Half Acre (Interstate 15 Trails)	1.5	There are two interpretive trails located at the Idaho Transportation Department rest stops on Interstate 15, one trail at the northbound rest stop and one trail at the southbound rest stop. Both trails are paved and at least partially accessible by wheelchairs. Both trails, Hell's Half Acre North and Hell's Half Acre South, are each 0.75 mi long.
Hell's Half Acre (Twenty-Mile Trail)	6	The Hell's Half Acre Twenty-Mile Trail is located at the north end of the lava flow. There is a trailhead with a sign. The trail system includes a 0.5-mi loop and a 5.5-mi loop of undeveloped (unpaved) trails marked by trail markers.
Game Creek	1	Game Creek Trail includes a trailhead with a sign, but there are no other interpretive signs located on the trail. There are undeveloped places to camp at the trailhead.

This page left intentionally blank.

2.25. Lands and Realty

2.25.1. Current Level

As provided by FLPMA, the BLM has the responsibility to plan for and manage public lands, which are defined as any land and interest in land (e.g., federally-managed mineral estate) owned by the United States and administered by the Secretary of the Interior through the BLM. The land surface and mineral ownerships within the Upper Snake PA are varied and intermingled; consequently, so are the administrative jurisdictions for land use and minerals. Ownership is mixed with State of Idaho and private lands interspersed among the FOA and other federally administered lands (**see Figure A-1, Appendix A–Maps**). Generally, the public lands are physically situated in large blocks, which provide for sufficient management opportunities; however, there are some areas of isolated parcels and smaller blocks of public lands that are more difficult to manage.

The goals of the lands and realty program are to:

- manage the public lands to support the goals and objectives of other resource programs
- provide for uses of public lands in accordance with regulations and compatibility with other resources, and
- improve management of the public lands through land tenure adjustments.

Major focus areas for the lands and realty program are land tenure adjustments (including mineral estate), ROWs/corridors, communication sites, and other land use authorizations. Wind and other renewable energy resources are permitted by ROWs through the BLM lands and realty program. The following sections describe the current conditions and characterization of lands and realty within the Upper Snake FOA.

Renewable Energy, Wind and Solar

On August 8, 2005, President Bush signed the National Energy Policy Act of 2005 (42 U.S.C. 149 § 15801 et seq.). The legislation promotes dependable, affordable, and environmentally sound production and distribution of energy for America's future. Section 211 of the National Energy Policy Act calls for the Secretary of the Interior to have approved non-hydropower renewable energy projects located on public lands with a generation capacity of at least 10,000 megawatts by 2015.

The Land Use Planning Handbook (BLM 2005a) requires that land use planning efforts address existing and potential development areas for renewable energy projects, including wind energy. The BLM encourages the development of wind energy within acceptable areas, consistent with the National Energy Policy Act of 2005 and the BLM Energy and Mineral Policy (BLM 2008h,i).

In October 2003, the BLM initiated the preparation of a Wind Energy Development programmatic EIS (PEIS) to address the impacts of the future development of wind energy resources on public lands. The DOE National Renewable Energy Laboratory assisted the BLM in the preparation of the PEIS and provided an inventory assessment of wind energy resources on public lands in the western U.S. Appendix B of the final PEIS, Idaho Field Office Boundaries Maps, shows that Idaho has wind resources consistent with utility-scale production (BLM 2005b); however, the majority of the Upper Snake FOA is categorized as poor to marginal with some localized larger areas east of Idaho Falls and in eastern Custer County that

rate as fair. There are a few small isolated areas mostly along ridge crests that have good to excellent potential for wind.

The PEIS ROD (BLM 2005c) addressed the amendment of individual BLM LUPs and established both policies and BMPs regarding the development of wind energy resources on BLM-administered public lands. The Upper Snake FO existing LUPs were not amended by the PEIS, but do currently follow the decisions made through the PEIS ROD, as directed by policy outlined in the BLM's Washington Office IM 2009-043 (BLM 2008i).

In May 2008 the DOE and BLM initiated a PEIS for solar energy development (73 FR 104, 2008); focusing the study on solar energy development in six western states that have the highest solar resource (Arizona, California, Colorado, New Mexico, Nevada, and Utah). The study looked at areas that contain solar resources with potential for utility-scale solar energy projects that could generate enough electricity to distribute to consumers through the electric transmission grid. Idaho, including the FOA, did not have solar resources that met this criterion. To date the Upper Snake FO has not received any applications for solar energy development.

Two ROWs have been issued for wind testing and monitoring project areas within the Upper Snake FOA. There has been several wind farms developed on private lands in the PA.

Land Use Authorizations

Examples of short-term uses include permits involving minimal land improvements or disturbances such as apiaries (i.e., beehives) and pivot wheel crossings. Examples of long-term uses include ROWs and leases for powerlines, highways, roads, communication sites, and pipelines.

A lease is an authorization to use public land for a fixed period. A lease is issued when there is going to be substantial construction, development, and improvement and there is an investment of large amounts of capital that will be amortized over time. In the Upper Snake FOA, there are several occupancy leases issued for inadvertent trespasses, as well as two authorized airport leases. The Recreation and Public Purposes Act, as amended (43 U.S.C. 20 § 869 et seq.), allows state and local governments, as well as qualified nonprofit organizations, the opportunity to lease (and potentially patent) public lands where there is a strong public need for a particular use. The Upper Snake FO has three leases authorized under this authority: a boat ramp, a portion of a recreation site, and a recreation site for a Boy Scout camp.

Permits are authorized when uses of public lands will be short term and involve little or no land improvement, construction, or investment. Permits have been a method to resolve unauthorized use, stipulating that the applicant remove or halt the unauthorized use and rehabilitate the land if necessary. There are ten agricultural permits authorized with future intent to have the holders remove their facilities from public land.

Withdrawals

A withdrawal is a formal action that results in one or more of the following actions:

- transfers total or partial jurisdiction of federally managed lands between federal agencies,
- segregates (closes) federal land to some or all of the public land laws and/or mineral laws, and/or

- dedicates land for a specific public purpose.

There are three major categories of formal withdrawals: congressional; administrative; and Federal Power Act 1920 (16 U.S.C. 12 § 791 et seq.), or Federal Energy Regulatory Commission (FERC). Congressional withdrawals are legislative withdrawals made by Congress in the form of public laws (i.e., Acts of Congress). Administrative withdrawals are made by the President, DOI Secretary, or other authorized officers of the Executive Branch of the federal government. FERC withdrawals are power project withdrawals established under the authority of the Federal Power Act.

The Upper Snake FOA includes 493,548 acres of withdrawn lands (**Figure A-1, Appendix A–Maps**). Examples of withdrawn areas include acres for DOE's INL, BOR projects, the FERC, and public water reserves. Other types of withdrawals of "de facto" withdrawals may occur when federal lands are segregated, restricted, or set aside for specific purposes by actions other than the formal withdrawals previously exampled. These withdrawn lands receive varying degrees of management, depending on the land uses and type of withdrawal.

In the early 1900s, several public water reserves (PWRs) were created by Presidential Executive Orders (EOs). With the exception of PWR No. 107, most of these PWRs have specific legal descriptions and have been noted to BLM's official records. By an EO dated April 17, 1926 (PWR 107, General Land Office 1927), all public lands containing a spring or water hole were included in a blanket withdrawal without identification of the lands affected. According to the EO,

> *"…every smallest legal subdivision of the public land surveys which is vacant unappropriated unreserved public land and contains a spring or waterhole, and all land within one quarter mile of every spring or waterhole located on unsurveyed public is hereby, withdrawn from settlement, location, sale, or entry, and reserved for public use."*

Lands withdrawn under PWR 107 have not all been identified on public land records; therefore, the locations are not always known, which makes protection and management of these areas under this EO challenging.

A review conducted under the authority of Section 204(1) of FLPMA identified public lands within the PA that are no longer needed for the purpose for which they were withdrawn. Certain withdrawals identified could then be modified, extended, or revoked according to the processes outlined in Section 204(a) of FLPMA and further process guidance provided by BLM's Washington Office (BLM 1996b). The revocation or termination of these withdrawn public lands would provide an increased opportunity to use these public lands for exchange, land disposals, mineral development, or other needs as indicated in the LUP. To date, as a whole, Congress has not addressed the recommendations that were outlined during the review process.

ROWs

The Upper Snake FO currently administers approximately 690 ROWs, with an average of 20 to 35 new ROWs being issued each year. These authorizations include such uses as roads, water pipelines, natural gas pipelines, transmission lines, telephone lines, fiber optic cables, railroads, canals, ditches, communications sites, and wind testing and monitoring areas.

Transportation system authorizations include reservations made for state and federal highways, and ROWs granted to counties and individuals for access roads. Within the PA, several major ROW corridors exist that include power lines, railroads, and interstate and state highways; however, these corridors crossing BLM-administered public lands were not designated through BLM's previous planning efforts. Even so, applicants are encouraged to use the existing corridors where possible. Corridors are established to accommodate preferred routes for transportation and transmission facilities. To the extent possible, linear ROWs such as roads and pipelines are routed where impacts would be least disturbing to environmental resources, taking into account point of origin, point of destination, and purpose and need of the project. Although established corridors exist, this does not preclude the location of transportation and transmission facilities in other areas, if environmental analysis indicates that the facilities are compatible with other resource values and objectives. Further identification of corridors may not necessarily mandate that transportation and transmission facilities would be located there if they are not compatible with other resource uses, values, and objectives in and near the corridors, or if the corridors are saturated. ROWs are issued with surface reclamation stipulations and other mitigation measures. Restrictions and mitigation measures may be modified on a case-by-case basis, depending on impacts to resources.

Section 368 of the National Energy Policy Act of 2005 required, among other things, the designation of energy corridors on federal lands in 11 western states and the establishment of procedures to ensure that additional corridors were identified and designated as necessary to expedite applications to construct or modify oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities. Congress specifically directed federal agencies through Section 368 to consider the need for upgraded and new facilities to deliver electricity throughout the western states. In January 2009, the ROD was signed for the Designation of Energy Corridors on Bureau of Land Management-Administered Lands in 11 Western States (BLM 2009c). The corridor designation was made by amending many LUPs including the Medicine Lodge RMP and the Big Desert MFP. The corridor designated in the process runs mostly along or just west of Interstate 15 for approximately 22.3 mi with a corridor width of up to 3,500 ft. The corridor was designated for multimodal use to accommodate both pipelines and transmission lines. The corridors may also accommodate other non-energy ROWs such as transportation systems as needed.

Communication Sites

The Upper Snake FO administers 26 ROWs or leases associated with communication sites. The majority of these authorizations are located within three main sites. The sites are referred to as East Butte, Menan Butte, and Telegraph Hill.

East Butte is an established communication site that accommodates a mixture of high- and low-power uses. Communication uses on East Butte include television, FM radio, microwave, cellular/personal communication system, two-way radio, and paging services. The portion of the butte used for communications sites is approximately 6,570 ft in elevation, over 1,200 ft higher than the surrounding valley floor. East Butte is located on BLM-administered public lands that are withdrawn by the DOE for the INL. Currently, the BLM and DOE administer the uses on the butte as outlined in an MOU (BLM and DOE 2008). The butte has been delineated into the south ridge and the north ridge. The south ridge is smaller and accommodates two uses, the north ridge was divided into ten individual lots, and only one lot remains undeveloped. A communication site plan is in place for this location (BLM 2003c), and all new and renewed authorizations are subject to this plan.

Menan Butte is an established communication site that accommodates low-power communication facilities. Current uses include microwave, two-way radio, and cellular telephone. The site is situated between 5,595 and 6,515 ft in elevation, approximately 1,700 ft higher than the surrounding land. There is no legal public access to the site; therefore, users must make arrangements for access with the current private landowner. Menan Butte's unique origin by volcanic formation through water resulted in the designation of 1,124 acres of the butte as a NNL by the NPS and also being designated as an ACEC in the Medicine Lodge RMP. A communication site plan is in place (BLM 2005d), and no new communication sites are allowed at this location. All renewed authorizations are subject to this plan.

Telegraph Hill consists of four dispersed facilities. Current uses included microwave and two-way radio. The site is located along U.S. Highway 20, northeast of Atomic City, Idaho. Two of the facilities are located on BLM-administered public lands that are withdrawn by the DOE for the INL. The BLM and DOE administer the uses as outlined in an MOU (BLM and DOE 2008). To date, a communication site plan has not been developed for Telegraph Hill.

Land Tenure Adjustments

As mandated by FLPMA, public lands are retained in federal ownership, with the exception of public lands that have potential for disposal as identified in a LUP. Public lands have potential for disposal when they are isolated and/or are difficult to manage. Public lands identified for disposal must meet public objectives, such as community expansion and economic development. Other public lands can be considered for disposal on a case-by-case basis. Public lands classified as withdrawn, reserved, or otherwise designated are not available for sale or exchange. Most requests from private individuals to acquire public lands involve public lands surrounded by, or adjacent to, their private lands. These requests generally result as a matter of proximity (e.g., of farm operations, grazing, and/or residential properties) and the need to either expand operations or make operations more efficient.

As previously stated, the Upper Snake FOA contains a mixed ownership land pattern. Although the potential for resource values may be high on some public lands, lack of access or isolation from other resources makes them very difficult to manage. Land tenure adjustments within the FOA help to resolve split mineral estate situations, consolidate public lands (either through sale, exchange, or acquisition), acquire access, and resolve unauthorized use cases. Land tenure adjustments are also important to local and state governments to consolidate ownership and to make lands available for public purposes. The public lands currently identified and available for disposal in the existing planning documents are shown on **Figure A-24, Appendix A–Maps**.

The Federal Land Transaction Facilitation Act (FLTFA) of 2000 (43 U.S.C. 41 § 2301 et seq.) allows for the proceeds from the disposal of public lands to be used by the BLM to acquire inholdings and other lands that will improve the resource management ability. The proceeds may also be used to complete appraisals and satisfy other legal requirements for the sale or exchange of public land identified for disposal. This act applies to public lands identified in current LUPs as suitable for disposal as of July 25, 2000. Public lands identified in current LUPs and amendments, totaling 9,675 acres, are identified in **Appendix C**.

Following are descriptions of the land tenure adjustments as allowed under FLMPA.

- Sale—Public lands sales are managed under the disposal criteria set forth in Section 203 of FLPMA. Public lands determined suitable for sale shall be offered on the initiative of the BLM and sold at not less than fair market value. Public lands suitable for sale must be identified in the LUP. Any public lands to be disposed of by sale that are not identified in the current LUP require a plan amendment before a sale can occur.
- Acquisition—Acquisition of private land, or interest in land, is pursued to facilitate various resource management objectives and is authorized under Section 205 of FLPMA. Acquisitions, including conservation easements, are generally completed through exchanges, purchases (including Land and Water Conservation Fund [LWCF]), donations, or receipts from FLTFA, the Bonneville Power Administration (BPA), or other efforts. The Upper Snake FO has received approximately $38M to acquire, and protect from future development, 17,683 acres of lands within the Snake River ACEC/SRMA. Additionally, the FO has received approximately $1.5M to protect 1,365 acres within the Henry's Lake ACEC. These acquisitions were made possible through cooperation with the Teton Regional Land Trust (TRLT), The Conservation Fund (TCF), The Nature Conservancy (TNC), and from funds provided by BPA, LWCF, and FLTFA.
- Exchange—Land exchanges, as authorized under Section 206 of FLPMA, are initiated either in direct response to public demand or by the BLM to improve management of the public lands. Public lands need to be identified as suitable for exchange in a LUP. Private and state lands are considered for acquisition through exchange of suitable public land, on a case-by-case basis, where the exchange is in the public interest and where the acquisition will result in higher resource or public values than the lands that are being exchanged.

Access

Currently, access needs are prioritized and subsequently addressed when there are landowners willing to sell land or easements to provide administrative and/or public access, and there are funds available to secure the access. Many of the easements acquired in the Upper Snake FOA are short term to administer forestry-related activities and public access is not secured. Most of the isolated parcels lack legal access. Public criticism and inquiries regarding access to public lands within the Upper Snake FOA have increased significantly within the last 5 years. Not only does the public have limited access to public lands for recreation purposes, in many cases the BLM does not have legal access to manage or monitor areas that have resource values or authorized uses occurring on them. It is anticipated that public demand for access will increase, as there are more users of public land and access continues to be limited.

Conflicts—Known or Potential

As the demand for the use of public lands for renewable energy development increases, the potential for resources and other resource use conflicts may arise. It will be a challenge to protect resources while providing for multiple uses of the public lands.

2.25.2. Forecast

The demand for alternative energy-related ROWs is predicted to increase nationally, including those limited areas within the FOA that have potential for wind energy. The Upper Snake FOA has also seen a higher demand for non-energy related ROWs and this trend is expected to increase to accommodate infrastructure and other uses of public lands.

The interest in land tenure adjustments with the BLM remains constant, driven by the need to block up both private lands and those publicly owned mostly for administrative purposes. It is expected that as communities expand there will be a greater need for public lands for public purposes for such uses as municipalities, public services, and recreational facilities.

2.25.3. Key Features

In general, the Upper Snake FOA is open to renewable energy development and other land use authorizations except in locations set aside by Congress or areas with resource conflicts.

Discretionary withdrawals of public lands may be warranted in some areas to help manage and protect the public lands, such as ACECs or river segments determined eligible under the NWSRS.

This page left intentionally blank.

2.26. Mineral Resources

2.26.1. Current Level

The production of locatable, leasable, and salable minerals is not currently a significant component of the local or regional economy of the Upper Snake PA. However, a number of mineral commodities have been and are currently being produced. One of two precious opal deposits found in the United States is located east of Spencer, Idaho, along the northern boundary of the PA. Two mines currently produce and sell precious fire opal. Deposits of industrial-grade limestone, travertine, building stone, pumice, and low grade bentonite are also being produced in the PA. Deposits of sand and gravel are important sources of aggregate that are being developed to build and maintain the many miles of federal, state, and county roadways that are located throughout the PA. There is also an increased demand for aggregate materials as the population centers continue to grow.

Locatable Minerals

The Upper Snake PA has a history of mineral development that dates back to the early 1880s. A dozen mines in the Lava Creek Mining District southwest of Arco, Idaho, produced significant amounts of gold, silver, lead, zinc, and copper from the early 1880s through the mid 1940s. Perhaps the most important were those that were located in the Champagne Creek drainage, the Hornsilver, the Ella, and the St. Louis mines. Production from this mining district has been estimated at over 900 ounces (oz) of gold; 700,000 oz silver; 2M lb lead; 3M lb zinc; and 90,000 lb copper (Roby 1948).

In 1989, Idaho Gold Corporation opened its Champagne Mine, which mined the disseminated gold that occurred around the workings of the previously mined Hornsilver and Ella mines. Idaho Gold recovered an estimated 72,000 oz of gold and 2M oz of silver.

Near the northwestern boundary of the PA, mines in the Birch Creek Mining District were among the most important in Idaho during the late 1880s. Mining in this district declined rapidly with the close of the Viola Mine (north of the PA boundary). Ore was also discovered in the Hamilton and Dome mining districts on the southwest flank of the Lemhi Range in 1880. Similar to the mines in the Birch Creek Mining District, the mines produced mineralization from vein and replacement type deposits that were high grade, but were rapidly depleted. The mines in the Hamilton and Dome mining districts reported production of 110 oz of gold; 393,000 oz silver; 41.8M lb lead; 760,000 lb zinc; and 110,000 lb copper (Shenon 1928a,b; Anderson 1948).

In 1991, the USBM prepared a mineral resource appraisal of the Diamond Peak Roadless Area, a large tract of NFSL immediately adjacent to the Upper Snake FOA. The USBM reported that mineral resources still exist in the workings of the Hamilton and Dome mining districts. Individual mining claimants still maintain unpatented mining claims within these mining districts.

Travertine has been mined by Idaho Travertine near Fritz Creek at the headwaters of the Medicine Lodge Creek drainage and along the Fall River west of Swan Valley. The cut and polished slabs of travertine compete in the facing stone market with granite and marble from throughout the world. Thermocal of Idaho currently mines calcium carbonate at Lidy Hot Springs and produces an animal feed supplement that changes the pH in cattle's stomachs and helps them better utilize the feed that they consume. Several attempts have been made to develop high-grade limestone deposits near Reno Point and Leslie Butte for

processing sugar. However, the costs of transporting the limestone to the Burley–Paul area were too high to be competitive with the current suppliers.

In the late 1990s, interest was expressed in developing the quartzite deposits located in Idaho at Elbow Canyon east of Mackay, the quartzite knob north of Howe, and in the Arco Hills north of Butte City. Markets were never developed and transportation costs could not be overcome, so no development occurred.

Pumice has been mined from Tertiary ash flow deposits southeast of Idaho Falls since the 1930s. Through the mid 1990s, producers Pumice and Amcor supplied several light-weight block and pipe manufacturing plants in Idaho Falls and Burley, Idaho. Production was estimated at 25,000–30,000 tons annually. Currently, all mining occurs on private land and production goes to Amcor's block plant located south of Idaho Falls.

Gravel deposits along channels of the Snake River continue to be a potential source of placer gold. Savage (1961a,b) estimated that as much as 600 oz of placer gold had been recovered from within the PA between the 1870s and 1950s. Recovery of the flour gold has always been a challenge, and the latest attempt for recovery occurred in the Deer Parks area in the mid 1990s.

Since the BLM's surface management regulations were issued in 1981, the Upper Snake FO has processed several dozen notices to conduct exploration and plans of operation to mine limestone and quartzite (43 CFR II § 3809 et seq.). Only one of the notices remains active today.

The number of unpatented mining claims within the Upper Snake FOA dropped significantly in 1992 when the BLM required mining claimants to file a maintenance fee for their claims rather than submitting the previously required assessment affidavit. Currently, there are 575 unpatented mining claims within the Upper Snake FOA.

With the recent increase in precious and base metal prices, there has been a renewed interest in the old metallic mining districts found within the FOA and in areas where past exploration has been conducted for a variety of mineral commodities. A major block of unpatented claims has recently been filed in the Scott Butte area in the mouth of the Birch Creek Valley by Doe Run, one of the country's major producers of lead and zinc. Doe Run is currently core drilling on the claim block under an approved notice to conduct exploration.

Leasable Minerals

Leasable minerals include both solid and fluid mineral commodities. Solid leasable commodities included phosphate, coal, oil shale, sodium, and potassium. Fluid leasable commodities include oil and gas and geothermal resources.

Phosphate occurs on the NFSL west of Swan Valley, Idaho, and in the Centennial Mountains on the northern edge of the PA. In 1959, the E.A. Rex Mining Company was issued four phosphate leases on the Targhee NF west of Swan and Conant valleys. Although surface trenching and an underground adit were developed, no mining occurred. In 1997, E.A. Rex relinquished the four leases. Three phosphate leases are held by the J.R. Simplot Company and Monida Resources on the NFSL near the Idaho–Montana border. The two leases that are held by J.R. Simplot produced 131,000 tons of ore between

1956 and 1958. The surface minable phosphate on the leases has been depleted and any further mining would be conducted by underground mining methods. Exploration has been conducted on the Monida lease, but it never produced. It is doubtful that the underground reserves on the three leases will ever be economic to mine.

Coal deposits are known to occur in the Cretaceous age Frontier Formation on the NFSL in the Horseshoe Creek area of the Bighole Mountains approximately 11 mi west of Driggs, Idaho. Coal was discovered in 1882 and the sharply dipping coal beds were mined by underground mining methods intermittently until 1950. The coal was consumed in the Teton Valley. It is estimated that 100,000 tons of coal were mined from the area. It has been estimated that the Horseshoe Creek area may contain 8 to 11M tons of coal resources with a 13,300 BTU value (Kiilsgaard 1951). Unfortunately, the coal's location and the underground mining that would be required make it uneconomic to develop.

The potential for discovering oil or gas within the FOA is thought to be primarily associated with structural traps that are the result of mountain building activity, and those structurally complex areas where thrusting has placed younger reservoir rocks below older sedimentary rock units, which were the source of the hydrocarbons. These areas of thrusting occur along the Wyoming border and in the Medicine Lodge area. Coal bed methane was encountered in Cretaceous rocks in a well drilled south of Victor, Idaho, by the Anschutz Corporation in1986. Although no attempt to produce the methane was made at the time, it is possible that coal containing methane could underlie much of the Teton Basin and Bighole Mountains areas.

In 2006, the Departments of Agriculture, Interior, and Energy (2006) published Phase II of the Scientific Inventory of Onshore Federal Lands' Oil and Gas Resources and the Extent and Nature of Restrictions or Impediments to Their Development. This inventory included the Wyoming Thrust Belt, which includes the southeastern quarter of the PA, the extreme northeastern portion of the State of Utah, and a sliver of extreme western Wyoming. This area is estimated to contain 5,000–12,000 barrels of oil/mi^2 and 0–58M ft^3 of gas/mi^2. The lands on the western edge of the Teton Valley are estimated to contain 150–349M ft^3 of gas/mi^2 (U.S. Departments of Agriculture, Interior, and Energy 2006).

As a result of the oil embargo in the 1970s, the majority of the FOA was eventually leased for oil and gas. Over the years, however, all of the leases expired with little or no exploration being conducted. Those exploration wells that were drilled were located on the NFSL adjacent to the Upper Snake FOA. Although these exploratory wells were plugged and abandoned, they did encounter both source rocks and reservoir rocks that have produced hydrocarbons in Wyoming and Utah.

With the passage of the Federal Onshore Oil and Gas Reform Act of 1987 (30 U.S.C. 3A § 181 et seq.), Congress eliminated the lottery system that BLM had formerly used to issue oil and gas leases and required a competitive leasing system. BLM regulations now require that parties interested in leasing BLM-administered public lands submit an expression of leasing interest for specific tracts of land. The lands contained in the expressions of leasing interest are evaluated to determine what stipulations are required to protect other surface resources. A programmatic environmental assessment (EA) was prepared for the FOA in 1988. The leasing stipulations from the EA (BLM 1988a) will be reviewed as an integral part of the planning process to determine if they are effective in protecting other surface resources values or whether they should be revised.

The Upper Snake FO has processed two previous expressions of leasing interest and two more are currently being adjudicated in the Idaho State (BLM) Office. Currently, nine oil and gas leases covering 16,000 acres have been issued on the FOA in Jefferson County.

Although a number of hot springs is found within the PA, there has been little interest in leasing geothermal resources within the FOA. According to Mitchell, Johnson, and Anderson (1980), the lands east of Idaho Falls and north to Ashton, Idaho, are classified as having the potential for the discovery and development of local sources of low-temperature water (geothermically speaking, low temperature is less than 90ºC/194ºF). Wells have been drilled in the Newdale, Idaho, area but no geothermal energy is being produced. The federal government has no surface or mineral estate in this area.

The Island Park known geothermal resource area (KGRA) covered most of the NFSL in the Island Park area as well as some of the FOA west of the Targhee NF. In 1984, Congress placed a moratorium on geothermal leasing in the Island Park KGRA to protect the geothermal features of Yellowstone National Park. Subsequently, the Geothermal Steam Act Amendments of 1988 (30 U.S.C. 23 § 1001 et seq.) made the previous ban on leasing permanent. In 1993, the BLM revoked the Island Park KGRA. These actions have permanently removed public lands in the Island Park area from consideration for geothermal leasing.

In 2004, a geothermal lease was issued near Willow Creek along the Bonneville and Bingham County line. Interest in the area is the result of the high, bottom hole temperature that was encountered in an oil and gas well that had previously been drilled in the area. To date, no drilling has been conducted on the federal or private leases that were issued in the area.

Saleable Minerals

The Upper Snake FO has an active mineral material disposal program. The primary commodity produced in the FOA is sand and gravel; however, major quantities of building stone and landscaping rocks are also produced. There are currently 7 community pits, 9 common use areas, 48 free-use-permits, and 23 mineral material sales contracts that have been issued to local contractors as well as local, county, and state government entities. In addition, there are numerous material site ROWs that have been issued to the Idaho Transportation Department (ITD) for aggregate sources throughout the PA.

An estimated 2,500 tons of platy andesite have been sold from the Maud Mountain–Devil's Gap area west of Dubois, Idaho. At one time, Thomas American Stone in Salt Lake City, Utah, located mining claims on a portion of the deposit. However, the BLM has determined that the stone is a common variety and not locatable under the BLM's surface management regulations (43 CFR II § 3809 et seq.). Black basalt rock is also sold by the BLM from the Hell's Half Acre lava flow west of Interstate 15 between Idaho Falls and Blackfoot, Idaho. Although the basalt rock is used as a stack rock, it is less popular than the play andesite because of its dark color.

2.26.2. Forecast

Current market projections indicate that the demand for precious and base metals, as well as industrial minerals, will continue to increase in the future. The demand for oil and gas will also continue to increase. Incentives contained in the President's National Energy Policy Act will encourage the development of alternative energy sources such as geothermal and wind power. As a result, the

exploration and development of locatable, leasable, and saleable minerals is expected to increase throughout the Upper Snake FOA.

Locatable Minerals

A number of mining districts located in the FOA contain underground workings from previous mining activities. When metals prices are high, these areas become of high interest for further exploration. It is anticipated that new mining claims will be located in these areas and that notices to conduct exploration and plans of operation will be filed under the BLM's surface management regulations (43 CFR II § 3809 et seq.). Passage of mining law reform that Congress is considering could have an economic impact on those companies that are currently mining or are proposing to mine on the public lands.

Leasable Minerals

The objectives of BLM's oil and gas leasing program are the following:

- support the domestic need for energy resources,
- make public lands available for leasing through proper planning,
- process applications and notices for exploration and development in a timely manner, and
- conduct inspections of operations to ensure compliance with lease terms and regulations.

Based on land use decisions made as a result of the planning process, BLM-administered public lands and reserved federal mineral estate in the PA could be made available for oil and gas leasing and exploration subject to any/all of the following:

- standard lease stipulations,
- conditions that require a NSO stipulation(s) to protect such conditions as steep slopes, distances from surface waters, riparian–wetland areas, historic trails, archeological values, or existing ROWs,
- timing stipulations that restrict occupancy to protect threatened, endangered, or sensitive species or other important wildlife species or their habitat, and
- conditions that require that the lands not be leased.

The Upper Snake PA's proximity to the Overthrust Belt in Wyoming and the existence of thrust plates beneath portions of the PA has resulted in the lands being designated as having the highest potential for discovering oil and gas resources within the state of Idaho. As a result of that potential, it is expected that there will be continued interest in leasing BLM-administered public lands for oil and gas. Industry recognizes, however, that the cost of exploration for oil and gas and the economic risk of that exploration in Idaho, a state that has had no oil and gas production, is high. Leasing and exploration is unlikely to occur without sustained favorable market conditions.

The objectives of BLM's geothermal leasing program are very similar to those of the oil and gas program. Based on land use decisions made as a result of the land use planning process, public lands can be made available for leasing. Ultimately, however, it would be the geothermal energy producer's responsibility to determine if the public lands that have geothermal potential, and are available for leasing, are located near transmission facilities that are available with excess capacity, or can be constructed to move the generated power to a point of consumption.

Saleable Minerals
Reconstruction and maintenance of federal, state, and county roads will continue to necessitate the development of aggregate sources throughout the FOA. While the Idaho DOT and the various counties already have a number of established sources, it is forecast that additional sources will be requested in the future.

Requests will continue to be made to sell landscaping boulders and building stone from the public lands. The primary sources of the boulders would be the steep alluvial fans along the slopes of the Big Lost and Lemhi Mountains.

The BLM will have to determine if and where they will sell landscaping boulders and building stone from the public lands. If so, common use areas would be needed to support sales activities. There will also be a continued demand to sell sand from the Red Road area by both area potato producers and local contractors.

2.26.3. Key Features

Within the Upper Snake FOA, the highest potential for mineral and energy use are:

- Locatable mineral exploration and possible development—Public lands adjacent to existing metal and industrial mineral mines and prospects, and areas where multiple mining claims have been located.
- Oil, gas, and geothermal leasing and development—Public lands that have been identified as having low, moderate, or high potential for oil, gas, and geothermal exploration.
- Salable mineral disposal and development—Public lands adjacent to and surrounding the current mineral material disposals sites and lands underlain by alluvial material that lie adjacent to federal, state, and county roads.

2.27. Special Designations

2.27.1. Areas of Critical Environmental Concern

The Federal Land Policy and Management Act of 1976 states that the BLM will give priority to the designation and protection of "areas of critical environmental concern" (i.e., ACECs) in the development and revision of LUPs (43 U.S.C. 35 § 1701 et seq.). BLM regulations define an ACEC as an area

> *"…within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards."* (43 CFR II §1610 et seq.)

The ACEC designation indicates to the public that the BLM recognizes that an area has significant values and has established special management measures to protect those values. In addition, ACEC designation also serves as a reminder that significant values(s) or resource(s) exist that must be accommodated when future management actions and land use proposals are considered near or within an ACEC. Designation may also support a funding priority. Although private, state, or federal lands may be located within the boundaries of an ACEC, only BLM-administered public lands (i.e., the FOA) may be included in the ACEC designation.

The ACEC designation is an administrative designation that is accomplished through the land use planning process. It is unique to the BLM in that no other agency uses this form of designation. The intent of Congress in mandating the designation of ACECs through FLPMA was to give priority to the designation and protection of areas containing unique and significant resource values. ACECs differ from other special management designations such as WSAs in that ACEC designation by itself does not automatically prohibit or restrict other uses in the area. The one exception is that a mining plan of operation is required for any proposed mining activity within a designated ACEC.

An RNA is a type of ACEC that is assigned using the ACEC designation process. RNAs may be set aside to preserve and protect typical or unusual ecological communities, associations, phenomena, characteristic(s), or natural features or processes. Activities within these areas may only be allowed if they do not interfere with natural processes. Areas may consist of diverse vegetative communities, wildlife habitat, unique geological formations, cultural resources, and other values identified by physiographic province as outlined in state or agency natural heritage planning documents. RNA designation must meet one or more of the following characteristics:

- a typical representation of a common plant or animal association,
- an unusual plant or animal association,
- a T&E plant or animal species,
- a typical representation of common geological, soil, or water features, or
- an outstanding or unusual geologic, soil, or water feature.

To be considered as a potential ACEC and analyzed during the land use planning process, an area must meet the criteria of relevance and importance listed in BLM Manual 1613 (BLM 1988b).

Relevance Criteria
An area meets the relevance criterion if it contains one or more of the following:

1. A significant historic, cultural, or scenic value (including, but not limited to, rare or sensitive archeological resources and religious or cultural resources important to Native Americans).
2. A fish and wildlife resource (including, but not limited to, habitat for endangered, sensitive, or threatened plant species, or habitat essential for maintaining species diversity).
3. A natural process or system (including, but not limited to, endangered, sensitive, or threatened plant species; rare, endemic, or relic plants or plant communities that are terrestrial, aquatic, or riparian–wetland; or rare geological features).
4. Natural hazards (including, but not limited to, areas of avalanche, dangerous flooding, landslides, unstable soils, seismic activity, or dangerous cliffs). A hazard caused by human action may meet the relevance criteria if it is determined that the hazard has become part of a natural process.

Importance Criteria
The value, resource, system, process, or hazard previously described must have substantial significance and values to satisfy the importance criteria. This generally means that the value, resource, system, process, or hazard is characterized by one or more of the following:

1. It has more than locally significant qualities that give it special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resource.
2. It has a quality or circumstance that makes it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change.
3. It has been recognized as warranting protection in order to satisfy National priority concerns or to carry out the mandates of FLPMA.
4. It has qualities that warrant highlighting to satisfy public or management concerns about safety and public welfare.
5. It poses a significant threat to human life and safety or to property.

Twelve ACECs have been formally designated within the Upper Snake FOA, seven of which are RNAs. Ten ACECs were designated under the Medicine Lodge RMP (BLM 1985), one was designated under the Big Desert MFP (BLM 1981b), and one was designated under the Challis FO RMP (BLM 1999d), which amended the Little Lost/Birch Creek MFP (BLM 1981b). Since approval of the existing Upper Snake FO LUPs, nine additional ACECs (including four RNAs) have been proposed for designation by various interested parties. The designated and proposed ACECs are routinely monitored to document overall condition, disturbances, resource damage, and visitor use.

Table 2-50 presents the designated and proposed ACECs.

The paragraphs that follow the table provide detailed descriptions of each ACEC, in the same order they appear in the table. The section on proposed ACECs includes a discussion of the relevance and importance criteria that were determined for each by the Upper Snake FO RMP IDT.

Table 2-50. Designated and proposed ACECs in the Upper Snake FOA.

Designated ACECs				
Feature Name	**Designation Date**	**Size (acres)**	**Reason For Designation**	**Land Use Plan**
China Cup Butte RNA	1/29/1965	160	Geological	Big Desert MFP
Nine Mile Knoll ACEC	9/21/1987	42,343[a]	Wildlife	Medicine Lodge (ML) RMP
St. Anthony Sand Dunes RNA	11/29/1985	1,825	Botanical, Geological	ML RMP
North Menan Butte ACEC	11/29/1985	1,124	Geological	ML RMP
North Menan Butte RNA	11/29/1985	346	Botanical, Geological	ML RMP
Henry's Lake ACEC	7/28/1997	2,415	T&E Species, Riparian–Wetland	ML RMP
Snake River ACEC	11/29/1985	20,351	Recreation, Scenic, Riparian, Fish and Wildlife (Bald Eagle)	ML RMP
Pine Creek Island RNA	11/29/1985	54	Botanical	ML RMP
Reid Canal Island RNA	11/29/1985	29	Botanical	ML RMP
Squaw Creek Island RNA	11/29/1985	38	Botanical	ML RMP
Game Creek RNA	11/29/1985	354	Botanical	ML RMP
Donkey Hills ACEC	7/29/1999	4,033	Wildlife	Little Lost–Birch Creek MFP
Proposed ACECs				
		Size (acres)	**Reason For Designation**	
Knoll Kipuka RNA		480	Botanical	
Kettle Butte Kipuka ACEC		251	Botanical	
Southwest Lemhi Range ACEC		5,225[b]	Botanical, Cultural	
Middle Canyon Alluvial Fan RNA		1,725	Botanical	
Badger Creek ACEC		4.5	Botanical	
Cedar Butte ACEC		4,978	Botanical, Geological, Wildlife, Cultural, Recreation	
Big Southern Butte RNA		586	Geological, Botanical, Cultural	
Teton River ACEC		3,412	Fish and Wildlife, Scenic, Riparian and Upland communities	
Main Snake River ACEC		2,765	Fish and Wildlife, Scenic, Riparian	

a. Acreage for Nine Mile Knoll ACEC has been recommended by the Upper Snake FO RMP IDT to be increased to 54,550 acres.

b. Formerly recommended as an RNA with 934 acres. Currently recommended as an ACEC encompassing a larger footprint than the original proposal (approximately 5,225 acres).

2.27.1.1. Designated ACECs

China Cup Butte RNA

China Cup Butte is located about 18 mi southwest of Atomic City, Idaho, with Big Southern Butte lying about 9 mi directly north. China Butte RNA was designated in 1965 as an RNA in recognition of the geologic importance of this feature. China Butte RNA is shown on **Figures A-25 and A-26, Appendix A–Maps.**

China Cup Butte is a small 1500-ft wide, 100-ft tall basaltic cinder cone with a nearly perfect 'ring' shape formed by natural processes of explosive volcanic eruption. The cone is one of three maar-type volcanoes, the other two being Split Butte and Sand Butte, which have been closely studied because of their mutual similarity and their possible relationship to volcanic craters on the moon. The cone is most appropriately described as a cinder-and-spatter cone, as it is composed of alternate layers of fragmented scoria (cinders) and congealed basaltic lava. The explosive character of the eruption that formed the crater is evidenced by the many small 1-in. to 2-ft glassy volcanic 'bombs' that have accumulated on the sides of the volcano (Satter 1982).

The butte is encircled by a 200 to 300-ft wide moat-like depression formed during the emplacement of the volcano. The 'moat' separates the volcano from encircling basalt lava flows. A large, sinuous collapsed lava tube is also located near the southern boundaries of the tract (Satter 1982).

The dominant vegetation is a Wyoming basin sagebrush cover type. China Cup Butte is of high scenic value and can be easily accessed by an unimproved road that runs along its southern and eastern boundary. Livestock grazing occurs within the site in the Houghland allotment. The butte is currently withdrawn from mineral and agricultural entry, public sale, and state exchange. No ground-disturbing activities within the RNA are allowed unless required for scientific research (BLM 1981b). Current management actions and restrictions associated with the China Cup Butte RNA have been effective in preserving and protecting the geologic values (basaltic cinder cone) for which the area was designated.

Nine Mile Knoll ACEC and St. Anthony Sand Dunes RNA

The Nine Mile Knoll ACEC is located in the northeast portion of the Snake River Plain approximately 6 mi west and northwest of St. Anthony, Idaho, as shown in **Figure A-25, Appendix A–Maps**. The ACEC encompasses all of the St. Anthony Sand Dunes that reside on public lands and approximately 36 mi^2 of vegetated desert public lands primarily located south and southwest of the sand dunes. A smaller RNA designation, known as the St. Anthony Sand Dunes RNA, is located within the boundaries of the ACEC. The RNA was nominated for designation by BLM personnel in 1983 during a meeting with Edwin Tisdale and Charles Wellner of the Idaho Natural Areas Coordinating Committee (INACC) (Caicco and Wellner 1983a). The Nine Mile Knoll ACEC was designated through the Medicine Lodge RMP primarily to protect habitat for wildlife. The St. Anthony Sand Dunes RNA was designated because of its unique ecological setting within an isolated area of large active sand dunes possessing a great variability in dune stability and a complex series of successional vegetative stages.

The central portion of the ACEC (the active dunes) is also designated as a WSA and an SRMA. In 1982, the NPS evaluated the St. Anthony Sand Dunes for potential designation as a NNL, but the area was never officially designated.

The St. Anthony Sand Dunes contains the largest and most spectacular dunes in a natural condition in the Columbia Plateau Region. The presence of a large sand dune this far inland is rare and makes the area geologically significant (BLM 1984). The active dune field trends northeast for 35 mi and is 5 mi wide, with dunes ranging from 50 to 400-ft tall. The St. Anthony Sand Dunes is the largest tract of sand dunes in Idaho, covering approximately 175 mi^2. The sand is thought to be blown in from the vast Snake River Lava Plain which, in some areas, contains extensive deposits of sandy soil. The sand is fine grained and is composed mainly of quartz with many other rock fragments and minerals. Older dunes, now stabilized by plants, cover much of the surrounding area. The rounded hills on the north side of the dunes, the Juniper Buttes, are extinct volcanoes (BLM 2000b).

The majority of the sand dunes are unvegetated, but a pioneering community on drifting sands consists of sand wildrye (*Leymus flavescens*), scurfpea (*Psoralea lanceolata*), and rubber rabbitbrush. The deep stabilized sand is dominated by antelope bitterbrush and chokecherry. Outside the active dunes within the ACEC boundary, an area known as the Sand Creek Desert is primarily comprised of a Wyoming basin sagebrush cover type.

The St. Anthony Dunes evening primrose is classified as a BLM sensitive plant and is found only at these dunes. Its relative, the pale evening-primrose, occurs in a number of counties in southern Idaho, but a special pubescent, or hairy form, of this plant is known to occur only at the St. Anthony Sand Dunes. In addition, the St. Anthony Sand Dunes boasts the largest and most viable population of a rare tiger beetle that is known from only two other locations, both in southern Idaho (BLM 2000b).

Antelope, mule deer, elk, and moose migrate long distances to overwinter in and around the dunes. The St. Anthony Sand Dunes hosts the largest wintering elk population in North America. To protect wintering wildlife, the dunes and large tracts of adjacent public land are closed to human entry during the winter months. Approximately 10,000 acres of mule deer winter habitat were recently removed as a result of a game-proof fence on private land to contain domestic elk adjacent to the Nine Mile Knoll ACEC boundaries. An additional 12,000 acres of deer winter range were burned in the Menan Butte wildfire of 2003. These losses of habitat have greatly increased the importance of public lands within the ACEC for wildlife winter range. As a result, the IDT has proposed considering, through the RMP planning process, the expansion of the ACEC boundaries (from 42,343 to approximately 54,550 acres) to aid in protection of additional big game winter habitat to the north and east of the current designation.

Livestock grazing occurs within the ACEC in the Junipers, Egin Lakes, Plano, Quales, Nine Mile Knoll, Pole Line, Grassy Ridge, Bitterbrush, and West Ridge allotments. The St. Anthony Sand Dunes RNA is located within the Junipers allotment. Management constraints that apply to the Nine Mile Knoll ACEC include no disposal of public land, no new roads or major ROWs, a winter vehicle and human entry closure, and seasonal occupancy for oil and gas exploration and development. No changes in vegetation are allowed under the St. Anthony Sand Dunes RNA designation (BLM 1985). Although current management actions and restrictions associated with the Nine Mile Knoll ACEC have been effective in preserving and protecting primarily the wildlife habitat for which the area was designated, expansion of the boundaries would provide a higher level of protection.

North Menan Butte ACEC/RNA

North Menan Butte lies at the confluence of the Henry's Fork of the Snake River and the main stem of the Snake River, as shown in **Figures A-25 and A-26, Appendix A–Maps**. It was designated as an

ACEC/RNA through the Medicine Lodge RMP, with the smaller RNA designation within the boundaries of the ACEC. It is also designated as an NNL with the boundaries matching those of the ACEC. The RNA was nominated for designation by BLM personnel in 1983 during a meeting with Edwin Tisdale and Charles Wellner of the INACC (Caicco and Wellner 1983b).

North Menan Butte is an outstanding example of a glassy tuff cone, which is found in only a few places in the world. The butte began as an eruption through the saturated alluvium of the Snake River Valley, and the erupted lava chilled suddenly to form basaltic glass, which then disrupted into small particles that formed a huge volcanic crater. The butte's large size and unusual composition make it particularly instructive of an unusual aspect of basaltic volcanism. North Menan Butte is outstandingly illustrative of a geologic process (Gibbons 1992).

The North Menan Butte RNA was chosen for designation because of its value as a unique geologic feature and because of the great variety of vegetation types that occur there. The sagebrush/grass types have as the dominant shrubs, basin big sagebrush, black sagebrush, or threetip sagebrush (*Artemisia tripartita*) with an understory dominated by bluebunch wheatgrass, Sandberg bluegrass, and needle-and-thread grass. In places, scattered Utah juniper combines with the basin big sagebrush and bluebunch wheatgrass to form a woodland (Caicco and Wellner 1983b).

North Menan Butte is of high scenic value and can be easily accessed by an unimproved road that connects to the paved highway north from the town of Menan, Idaho. The rim of the butte can be accessed via a series of hiking trails. A long history of unauthorized OHV use has degraded portions of the butte. However, recent rehabilitation efforts include a new trailhead on the west side with barriers, gates, and interpretative signs to preclude further damage. The area has been excluded from livestock grazing for many years. Several radio towers are located on the rim of the butte. Agriculture is the primary land use occurring on the private lands directly adjacent to the butte.

Management constraints that apply to the ACEC include NSO for oil and gas operations, and the area is closed to livestock grazing, OHV, and mining under the Mining Law of 1872. No changes to the vegetation are allowed in the RNA (BLM 1985). The Upper Snake FO RMP IDT has proposed that the RNA designation be discontinued, as it is located entirely within the boundaries of the ACEC. Management of the ACEC would be considered during the planning process to protect the entire area in accordance with current management of the RNA designation. Current management actions and restrictions associated with the North Menan Butte ACEC have been effective in preserving and protecting the resource values for which the area was designated.

Henry's Lake ACEC

The Henry's Lake ACEC was designated through an amendment of the Medicine Lodge RMP in 1997. The ACEC is located along the shore and in the Henry's Lake Flat area at the head of the Henry's Fork watershed. The ACEC is as shown in **Figure A-25, Appendix A–Maps**. The Henry's Lake Basin is located in the northeast corner of Idaho at the base of the Continental Divide in northern Fremont County. Henry's Lake is a natural, glacial-filled lake that was greatly increased in size many years ago by a dam. The lake and its tributaries make up the headwaters of the Henry's Fork of the Snake River. Henry's Lake is a beautiful mountain lake, famous for its trout fishing. This area is considered to be one of the most ecologically significant regions within the Greater Yellowstone Ecosytem (BLM 1997b).

The Henry's Lake WSA is within the boundaries of the ACEC. The main purposes for designating the Henry's Lake ACEC were protection of riparian–wetland areas, wildlife, recreation, and water quality resources from land disposal, and unrestricted ROWs and development. Another reason for the designation was to increase opportunities to pursue future protection and acquisition projects to augment the unique resources on public lands. The Upper Snake FO has received approximately $1.5M to acquire and protect from future development approximately 1,365 acres within the Henry's Fork ACEC. These acquisitions were made possible through cooperation with the TRLT, TNC, and from funds provided by BPA, LWCF, and FLTFA. The Henry's Lake ACEC is of high scenic value and can be easily accessed by U.S. Highway 20 and State Highway 87, both of which intersect the ACEC. A series of improved and unimproved roads also cross through the ACEC.

The wide open grasslands and wetland area of the Henry's Lake area provide critical habitat for peregrine falcons, gray wolf, bald eagles, and grizzly bears as well as crucial habitat for large numbers of big game, waterfowl, and sandhill cranes. The Henry's Lake and Henry's Lake Flat area contain extensive quality wetlands and miles of spring creeks. The Henry's Lake area is renowned for its vast, diverse, and unique wetlands including two white spruce (*Picea glauca*) community types rated as rare by the IDCDC. Henry's Lake is the only site in Idaho with a white spruce vegetative community. Other plants in the area rated as rare by the IDCDC include hoary willow (*Salix candida*), mountain willow (*Salix pseudomonticola*), swamp willow weed (*Epilobium palustre*), green keeled cottongrass (*Eriophorum viridicarinatum*), and pale sedge (*Carex livida*) (BLM 1997b).

Before the dam raised the water elevation in Henry's Lake, there were unique floating islands that were recorded by early trappers. The white spruce bog vegetative types found along the east and north shores of the lake are believed to be remnants of the floating islands. The white spruce vegetative community grows on peat soils that extend from the bank. The historical islands prompted early explorers to believe that Henry's Lake should be included with Yellowstone National Park (BLM 1997b).

Prior to the ACEC designation in 1997, public use and development had exploded in the area since the Medicine Lodge RMP was approved in 1985. These activities were posing threats to natural resources and associated recreational values in the Henry's Lake area. Timber harvest on three scattered parcels of public lands has occurred in the ACEC area. However, these areas are recovering and no future timber harvests are planned (BLM 1997b). Livestock grazing occurs in the ACEC in the Wild Rose, Salisbury, Staley Springs, South Shore, Henry's Lake Outlet, Lloyd Mickelsen, Keith Saurey, Enget, and Hittson grazing allotments.

Current management to protect the natural character of the Henry's Lake ACEC includes consideration of land exchanges, acquisitions, and ROWs only if they benefit the unique characterisitics of the ACEC and only if adverse impacts to special status species, recreation values, historical and cultural values, the Henry's Lake WSA, and other resources can be avoided or mitigated to protect the ACEC. Carey Act and Desert Land Act applications may not be considered within the boundaries of the ACEC, and all mining claimants are required to file a plan of operations for any mining-associated activity (BLM 1997b).

Snake River ACEC

The Snake River ACEC covers approximately 88 mi of river on public lands and includes the South Fork of the Snake River (South Fork) from Palisades Dam to the confluence with the Henry's Fork of the Snake River (Henry's Fork), the Henry's Fork from the confluence to St. Anthony, Idaho, and the main

stem of the Snake River (Main Snake) from the confluence south to Market Lake Canal below Lewisville Knolls. The ACEC is as shown in **Figures A-25 and A-26, Appendix A–Maps.**

The Snake River ACEC was designated through the Medicine Lodge RMP with the intent to recognize and conserve a unique cottonwood ecosystem, scenic values, bald eagle habitat, and other wildlife species and their habitats. The river flows through some of the most valuable terrestrial and aquatic wildlife habitat in Idaho. The Upper Snake FO has received approximately $38M to acquire, and protect from future development, 17,683 acres of lands within the Snake River ACEC. These acquisitions were made possible through cooperation with the TRLT, TCF, TNC, and from funds provided by BPA, LWCF, and FLTFA. The ACEC designation allows for authorized livestock grazing on public lands administered by the BLM (1985).

The Snake River ACEC is characterized by three sections: the upper section of the South Fork near Palisades Dam, a mountain valley; the middle section on the South Fork, a rugged canyon; and the lower section (including the Main Snake and Henry's Fork), a wide river with a broad, open flood plain. The Snake River SRMA falls within the same boundaries as the ACEC, and three RNA islands, Pine Creek, Reid Canal, and Squaw Creek reside inside the boundaries of the ACEC (see the next section for a discussion of each RNA island). Unique geologic features, wildlife, rare plants, and a cottonwood gallery forest make the ACEC an important ecological area. The South Fork from Palisades Dam to the confluence with the Henry's Fork is considered eligible under the NWSRS. Eligibile segments are to be managed by the BLM to protect the identified outstandingly remarkable values while allowing for public use and enjoyment until these segments are determined either suitable or non-suitable for inclusion in the NWSRS.

In addition to providing irrigation for millions of acres of agricultural land, the Snake River is also an international draw for recreational opportunities, which provides an inflow of cash to local economies. Recreational and commercial use of the river corridor is described in **Section 2.23**, Recreation and Visitor Services. Increases in use have the potential to degrade important resource values and even change recreation opportunities. In 2008, BLM finalized an EA and plan to revise the 1991 Snake River Activity/Operations Plan to ensure that the river is properly managed to prevent long-term damage or degradation of this high quality, yet fragile ecosystem (BLM 2008f).

The South Fork has one of the most extensive cottonwood riparian–wetland ecosystems in North America and is one of the last well-developed ecosystems of this type in Idaho. The USFWS has identified this area as the highest quality cottonwood riparian zone in the western United States (BLM 2008f). Wildlife that occupies the lands along the Snake River is a major concern. The extensive river banks and islands provide wintering habitat for bald eagles, elk, moose and mule deer, whitetail deer, and dozens of bird species. Much of the deer population remains year-round. The Snake River, particularly the South Fork, is a high-quality YCT fishery with brown, lake, and rainbow trout also present.

There are three special status species, Utah valvata snail, Ute ladies'-tresses, and yellow-billed cuckoo, that live in the Snake River ACEC.

The BLM administers 44 grazing allotments within the Snake River ACEC. Of those, 25 have active permits or leases and 19 are vacant.

Management constraints that apply to the Snake River ACEC include the following:

- No adverse impacts affecting the potential of the South Fork for NWSRS designation
- Limitation of public land uses located near or associated with archaeological sites and TCPs
- Incorporation of CTTM planning processes to ensure appropriate public access needs are balanced with resource management goals
- Completion of a visitor use or visitor capacity study prior to finalizing recreation standards for the Snake River ACEC.

Current management actions and restrictions associated with the Snake River ACEC have been effective in preserving and protecting the cottonwood galleries and diverse wildlife habitats for which the area was designated.

RNA Islands (Pine Creek, Reid Canal, and Squaw Creek)

All three of the RNA islands are located on the South Fork of the Snake River within the Snake River ACEC. The Snake River RNA Islands are shown in **Figures A-25 and A-26, Appendix A–Maps**. The Snake River RNA Islands are characterized by dense riparian vegetation. An overstory of middle-aged cottonwoods occurs on the islands with an understory of forbs, grasses, and scattered shrubs creating occasional park-like openings. Use of these areas is limited to research, study, observations, monitoring, and educational activities that are non-destructive and non-manipulative. Although historical livestock grazing and camping have occurred on the islands, grazing is not authorized, and there are no designated camping areas under the Medicine Lodge RMP (BLM 1985) or the decision record for the Snake River Activity/Operations Plan EA (BLM 2008g). All three RNAs maintain a relatively unmodified natural condition. The shape and size of the islands changes periodically as a result of the dynamic nature of the Snake River.

The Pine Creek Island RNA consists of two islands located approximately 1 mi downstream from the mouth of Pine Creek. The RNA is located within a bald eagle nesting territory. A foot trail has been created from fishermen who pull their boats in to fish from the banks. The RNA has the following vegetative community types:

- narrowleaf cottonwood (*Populus angustifolia*)/red-osier dogwood,
- narrowleaf cottonwood/herbaceous, and
- narrowleaf cottonwood/recent alluvial bar.

The Reid Canal Island RNA consists of three islands located approximately 1.5 mi southwest of Archer, Idaho, and about 2.25 mi down river from the Sunnydell rookery. Of the three river RNAs, Reid Canal is the most pristine and has the least amount of human influence from livestock or recreational use. Yellow-billed cuckoos have been documented to occur on the RNA islands (Saab 1993). The RNA has the following vegetative community types:

- narrowleaf cottonwood/red-osier dogwood,
- narrowleaf cottonwood/herbaceous,
- narrowleaf cottonwood/recent alluvial bar, and

- reed canarygrass (*Phalaris arundinacea*) habitat type.

The Squaw Creek Island RNA is a single island located at the mouth of Squaw Creek. It is a drier site than the other two RNA islands. In 1993, BLM personnel observed a leafy spurge patch on the southwest side of the island. In 1995, an interagency 'weed team' released a colony of black dot spurge flea beetles (*Apthona nigriscutis*) on the island to retard the expansion of the leafy spurge patch. Since that time, several releases of black dot spurge flea beetles and brown-legged spurge flea beetles (*Apthona lacertosa*) have been released on the island. In 2007, BLM personnel observed a 70–80% reduction of leafy spurge on the island and an increase in recovery of the native vegetation. During low flows when cattle can access the island from the adjoining USFS grazing allotment, occasional unauthorized livestock use results in resource damage. The RNA has the following community types:

- narrowleaf cottonwood/herbaceous, and
- water birch.

Management constraints that apply to the RNA islands include protection from inappropriate encroachment on the vegetation that would change their riparian characteristics. The Upper Snake FO IDT is considering through the RMP planning process that the RNA designation for the islands be discontinued, as they are located entirely within the boundaries of the Snake River ACEC. Management of the ACEC would include protection of the entire area in accordance with current management of the RNA.

Game Creek RNA

The Game Creek RNA is located about 3 mi southeast of Victor, Idaho, on the west side of the Teton Mountains. The RNA is shown in **Figure A-25, Appendix A–Maps**. The RNA, designated through the Medicine Lodge RMP, encompasses a cross section of the lower Game Creek Canyon. The steep gradient stream emanates from high in the Teton Range in Wyoming and flows through a glaciated canyon. The Game Creek drainage is a transition zone where both Engleman spruce and Colorado blue spruce (*Picea pungens*) are intermixed. Riparian vegetation consists largely of communities dominated by Engelmann spruce and red-osier dogwood. The RNA includes both the north- and south-facing canyon sides. The north-facing slope is dominated mainly by subalpine fir, while the south slope has a diversity of types including sagebrush-grass, Douglas-fir, and quaking aspen (Rust 1996). The Game Creek RNA was nominated for designation in 1984 by Charles Wellner of the INACC (Wellner 1984).

The Game Creek RNA includes several forest types. The blue spruce community makes this RNA unique in that no other established or proposed RNA in Idaho contains blue spruce (Wellner 1984). Healthy quaking aspen stands and Douglas-fir habitat types are also well represented in the Game Creek RNA. The site is of high scenic value, and offers an opportunity for primitive recreation and solitude. It is also an important wintering area for big game. Access is by vehicle and a foot-trail that parallels the stream.

The Game Creek RNA is in a municipal watershed that supplies drinking water to the town of Victor, Idaho. It is closed to livestock grazing and OHV use, and changes to the vegetation are not allowed (BLM 1985). Current management actions and restrictions associated with the Game Creek RNA have been effective in preserving and protecting the resource values for which the area was designated.

Donkey Hills ACEC

The Donkey Hills ACEC covers approximately 4,033 acres of public lands within the Upper Snake FO and 25,702 acres within the Challis FO. The RNA is shown in **Figure A-25, Appendix A–Maps**. Designation of this ACEC was done through the Challis FO RMP in 1999, and it amended the Little Lost–Birch Creek MFP. The Donkey Hills ACEC was designated with the intent to maintain and protect important biological, cultural, scenic, and other natural systems or processes by highlighting management of areas containing these resources. The primary relevance and importance factors for the designation include the following:

- winter range and calving habitat for 850 elk,
- regionally significant hunting opportunities, and
- habitat essential to long-term survival and viability of elk populations from several regional IDFG hunt units.

Several resources are present and several land uses are allowed in the Donkey Hills ACEC within the Upper Snake FOA. This area is crucial big game winter range. Logging is deferred because it is currently not economically feasible, and conventional methods would produce adverse impacts on the steep terrain. The area contains approximately 886 acres of productive forest land; the principal tree species is Douglas-fir. Most of the forest land is on slopes ranging from 40–60% grade, which limits logging opportunities by conventional methods. Livestock grazing is permitted in the area, but livestock use is light because of slope considerations and a lack of water. The area is open to minerals exploration and development, but minerals potential is low. Fire suppression strategy is to aggressively suppress all wildfires. Land exchanges to acquire IDL-managed lands in the Little Lost Valley are a priority.

Management actions that apply to the Donkey Hills ACEC within the Upper Snake FOA include the following:

- Require plans of operation for development of any new or existing mining claims.
- Review any new ROW applications to see if the proposal would negatively affect the values for which the area was designated. If so, deny the application.
- Tracts of land within an ACEC, if identified as available for disposal, may be exchanged for private or IDL public lands within or adjacent to the ACEC, provided the acquired lands are of equal or greater benefit to the integrity and management of the associated ACEC.
- Develop a land use activity plan to manage ACEC values in coordination with other resource uses and values in the ACEC, unless management would be addressed through an existing activity plan.
- Encourage studies and research, if consistent with protection of ACEC values.
- Manage other land uses within the ACEC to reduce or eliminate negative impacts to ACEC values.
- Aggressively suppress all wildfires in the Donkey Hills area to meet allowable burn acreage as follows: no fires larger than 200 acres based on values at risk; resource advisors would be consulted on all wildfires; and design wildfire suppression tactics to minimize impacts to visual, vegetation, and other resource values.

- Prohibit motorized vehicle travel from December 16 through April 30, and limit motorized vehicle travel the remainder of the year to existing roads and vehicle ways. Temporary exceptions to this limitation (e.g., travel off-road to retrieve downed big game, cut firewood, access a campsite, park, turn around, pass another vehicle, or for emergency purposes) would be authorized as specified in OHV use.
- Participate with Challis FO staff in development of a joint land use activity plan to manage elk habitat values in coordination with other resource uses and values in the ACEC.
- Pursue acquisition of IDL and private lands in the ACEC, with emphasis on land exchanges and cooperative efforts with conservation organizations such as the Rocky Mountain Elk Foundation.
- Continue to defer timber harvest in the Donkey Hills area because conventional logging is not possible, because of the terrain and adverse impacts on resource values), and helicopter logging is economically unfeasible. Should timber harvest by helicopter logging become economically feasible, apply the following stipulations to protect elk habitat quality: timber would be removed by helicopter logging to existing roads only, no new roads would be constructed; Douglas-fir would be harvested by shelterwood or group selection cuts only; clearcuts in lodgepole pine would be 10 acres or smaller; and a 200-ft uncut buffer zone would be left around the edges of all harvest units.

Current management actions and restrictions associated with the Donkey Hills ACEC have been effective in preserving and protecting the resource values for which the area was designated.

2.27.1.2. Proposed ACECs

Proposed Knoll Kipuka RNA

The proposed Knoll Kipuka RNA is located on the ESRP approximately 20 air miles southwest of Idaho Falls, Idaho, and 20 air miles north of Blackfoot, Idaho. The proposed RNA lies in the western portion of the Hell's Half Acre lava field within the Hell's Half Acre WSA and NNL. The kipuka is surrounded by gently undulating Pahoehoe lava flows. It was nominated for consideration as an RNA by BLM personnel in 1983 during a meeting with Edwin Tisdale and Charles Wellner of the INACC (Caicco and Wellner 1983c).

The kipuka is a loess-covered terrain which predates, and is surrounded by, two of the oldest flows of the lava field. Absolute ages for these flows are not available; however, Hell's Half Acre is thought to be slightly older than the Craters of the Moon lava field, thus making its age just over 2,000 years. All of the lavas that surround this kipuka are of the Pahoehoe type and exhibit the ropey structures, lava tubes and tunnels, collapse depressions, and fractures characteristic of the type. The fine-grained loess soils are subject to cracking when they dry (Caicco and Wellner 1983c).

The Knoll Kipuka was chosen for consideration as an RNA to represent vegetation types common on the Snake River Plain of southern Idaho in excellent condition. Both three-tip sagebrush and Wyoming big sagebrush occur as the dominant shrub over an understory of bluebunch wheatgrass. On the lava flows that surround the kipuka, a Utah juniper woodland occurs in which the tree density ranges from moderate to high. A mixed shrub understory that includes Wyoming big sagebrush and antelope bitterbrush is present in this habitat, while Sandberg bluegrass is common beneath the shrubs. Some minor timber cutting of juniper has occurred historically (Caicco and Wellner 1983c).

The site is of high scenic value and offers an opportunity for primitive recreation and solitude. Access is by foot as a result of the rough lava terrain. No OHV usage has occurred on the site, and such usage is unlikely because of the site's impassable terrain. Rabbits, rattlesnakes, bobcats, mule deer, and coyote are likely to occur as well as a variety of other wildlife (Caicco and Wellner 1983c).

The Upper Snake FO RMP IDT visited the site in 2007 to determine if Knoll Kipuka met the criteria of relevance and importance for formal designation as an RNA. Cheatgrass was abundant and dominant along the lower portions and south-facing slopes. Higher on the ridge, the vegetative resources were in good condition with bluebunch wheatgrass as the dominant grass. A network of wildlife trails (cottontail rabbits, coyote, deer, and elk) were found throughout the kipuka. High amounts of droppings indicated cottontail rabbits as the most common mammal in the area. The IDT concluded that the large population of rabbits may be responsible for spreading cheatgrass, resulting in degradation of the site condition. Knoll Kipuka is a sagebrush island that was missed by the most recent lava flow in Hell's Half Acre. The kipuka is located approximately 1.3 mi from the nearest road and is naturally protected from human influence with no need for special management to protect the area. Therefore, the area was determined to not meet any of the relevance or importance criteria.

Proposed Kettle Butte Kipuka ACEC

The proposed Kettle Butte Kipuka ACEC is located in the northwestern portion of the Hell's Half Acre lava field within the Hell's Half Acre WSA and NNL. The kipuka is surrounded by gently undulating Pahoehoe lava flows. It was nominated for consideration as an RNA in 1991 by Dr. Neil E. West from the College of Natural Resources at Utah State University (BLM 1992a).

The kipuka was chosen for consideration because of its importance as a relic area of a native sagebrush community. Two community types, basin big sagebrush/bluebunch wheatgrass and western juniper/mixed shrub (*Juniperus occidentalis*/mixed shrub) dominate the site. The value of Kettle Butte Kipuka was first recognized by the Soil Conservation Service research team in the 1950s. This team obtained 10 years of data on fluctuations in biomass in the 1950s and 1960s. Dr. West led a research project in the early 1990s to reexamine this area to determine whether vegetation and soils had changed in the interim. The data associated with these studies are archived at Utah State University. The changes recorded in these studies were a result of natural influences (i.e., climate) and did not include the influence of direct human induced impacts. Results of the studies are a beneficial tool for understanding sagebrush ecosystems as well as a tool for improved rangeland management (BLM 1992a).

The site has scenic value, and offers an opportunity for primitive recreation and solitude. The area is habitat for rabbits, bobcats, coyote, badgers, mule deer, antelope, vesper sparrows, horned larks, sage thrashers, and a variety of other wildlife. Access is by foot because of the rough lava terrain. During a BLM field visit in 1992, the following was noted:

> *"The vegetative community appears to be in an advanced seral stage with a canopy cover of 50% to 60% — very brushy. Many sagebrush plants are becoming decadent. Grasses are sparse and are not vigorous; much bare ground was noted. There is little diversity in the community. The presence of snakeweed, borages, and Russian thistle indicate some range deterioration even without direct human induced impacts…."* (BLM 1992a)

Similar observations were made during a BLM site visit in 2002. In addition, a considerable amount of cheatgrass was observed, and over 50% of the sagebrush was dead or dying (BLM 2002b).

The Upper Snake FO RMP IDT visited the site in 2007 to determine if Kettle Butte Kipuka met the criteria of relevance and importance for consideration in being designated as an ACEC. Cheatgrass was abundant and dominant throughout the site. Much of the sagebrush was dead or dying, sagebrush recruitment was very low, the forb component was quite sparse, and many of the native grasses had been replaced by cheatgrass. A network of wildlife trails (cottontail rabbits, coyote, deer, moose, and elk) were found throughout the kipuka. High amounts of droppings indicated cottontail rabbits as the most common mammal in the area. The IDT concluded that the large population of rabbits may be responsible for spreading the cheatgrass, resulting in degradation of the site condition. Periodic special use permits are issued to the Boy Scouts of America for camping in the area about every other year. A foot trail and fire ring were observed along the outer fringes of the area. Kettle Butte Kipuka is a sagebrush island that was missed by the most recent lava flow in Hell's Half Acre. It is not easily accessed except by foot, it is naturally protected from substantial human influence, and there is no need for special management to protect the area. Therefore, it was determined that the area did not meet any of the relevance or importance criteria.

Proposed Southwest Lemhi Range ACEC

The proposed Southwest Lemhi Range ACEC is located at the southern end of the Lemhi Range near Howe, Idaho, in Butte County. The proposed ACEC corresponds to the boundary of the Black Canyon WSA. The topography of the site is mountainous with steep slopes rising abruptly from the narrow canyon. It was nominated for consideration as an RNA (934 acres) by Edwin Tisdale and Charles Wellner of the INACC (Caicco and Wellner 1983d). However, following a 2007 field evaluation of the Southwest Lemhi Range, the IDT has proposed consideration of this area as an ACEC within a larger footprint of approximately 5,225 acres that would correspond to the boundaries of the Black Canyon WSA (see the following discussion).

The Southwest Lemhi Range was chosen for consideration because of its high habitat and floristic diversity and for its cultural values. At the time of the nomination, many of the community types had not been formally described. They include salt desert shrub communities dominated by shadscale, bluebunch wheatgrass, and Salmon River ryegrass (*Elymus ambiguous salmonis*). Utah juniper woodlands are well developed with a variety of bunchgrasses including bluebunch wheatgrass, needle-and-thread grass, and Salmon River ryegrass. Also present are low sagebrush and black sagebrush types and stands of mountain mahogany. In addition, both basin and Wyoming big sagebrush habitat types are present (Caicco and Wellner 1983d).

Two type 3 sensitive plants, Lost River milkvetch (*Astragalus amnis-amissi*) and Lemhi milkvetch (*Astragalus aquilonius*) potentially occur within the boundaries of the proposed ACEC (IDCDC 2007b). Type 3 plants are globally rare with moderate endangerment factors. Their global rarity and inherent risks associated with rarity make them imperiled species (BLM 2003a). Hooker's buckwheat (*Eriogonum hookerii*) is a rare, state sensitive plant that occurs within the boundaries of the proposed ACEC (IDCDC 2007b).

The Black Canyon WSA, approximately 5,230 acres, is located about 5 mi northeast of Howe, Idaho, and is easily accessible by two unimproved, parallel roads that proceed approximately 1 mi beyond the

mouths of two unnamed canyons located inside the proposed ACEC boundaries. This WSA features soaring, eroded, weathered limestone cliffs, and narrow juniper-filled canyons. The WSA provides habitat for deer, elk, antelope, mountain lion, coyote, golden eagles, and peregrine falcons.

BLM and ISU archaeologists have recorded numerous prehistoric Native American sites in the WSA. Many sites feature pictographs. Limestone caverns and rock overhangs in the WSA's canyons were used by prehistoric people as dwellings and for religious and ceremonial purposes. One site, Jackknife Cave, is a large (46 x 33 ft and 20 ft tall) rock shelter located near the southeast corner of the Black Canyon WSA. This shallow cave is a solution cavity formed in Mississippian Age limestone. It lies along the sagebrush-grass and sagebrush-juniper ecosystem boundary at the toe of the Southern Lemhi Mountains. Jackknife Cave faces southwest toward the Snake River Plain and the mouth of the Little Lost River Valley. In 1962 and 1963, Dr. Earl Swanson, Jr., and other ISU Museum of Natural History archeologists, excavated Jackknife Cave. The site's upper floor layers had been badly or totally disturbed by looters, but diagnostic undisturbed artifacts were discovered in the cave's lower layers. ISU archeologists recovered materials, artifacts, and other information from the cave that linked the site with similar prehistoric sites located in southeastern and south central Idaho. Charcoal recovered from the cave's hearths produced radiocarbon dates ranging from about 150–8,100 years BP. In 1995, BLM personnel repatriated an infant burial from the cave to the Shoshone–Bannock Tribes at Fort Hall, Idaho. In 1999 and 2000, BLM funded the detailed recording of the pictographs in Jackknife Cave and at over 30 other archaeological sites in the WSA. BLM partners and volunteers recorded the cave's red, yellow, and black pictographs and documented the graffiti left by recent visitors. A number of other sites are known to exist in the area, both within and adjacent to the proposed ACEC boundaries (Caicco and Wellner 1983d).

Livestock grazing occurs within the Bernice and Wigwam Butte allotments. Historical fire and/or timber cutting may have influenced the vegetation, but such disturbance was restricted in scope and has had only minor impacts. The area is of moderate value for primitive recreation, hunting, and solitude. A jeep trail extends up the canyon, but is seldom used, and no additional roads are currently being considered for the area. The area includes, or is adjacent to, historic bighorn sheep range. Poorly developed soils are important to the overall integrity of the steep slopes within the site, which contains excellent exposures of several units of the Brazer Limestone, including some with impressive fossil assemblages (Caicco and Wellner 1983d).

In 2007, the Upper Snake FO RMP IDT visited the site to determine if the Southwest Lemhi Range met the criteria of relevance and importance for consideration as an ACEC or RNA. Although several pockets of cheatgrass were observed, overall, the vegetative condition was found in good condition. The cultural resource sites were found to be stable and in fair to good condition. An old access trail runs to the entrance of Jackknife Cave; as such, the trail provides unintentional OHV access into the cave.

Consequently, OHV access to the cave increases the threat of vandalism and inappropriate uses (e.g., camping, fire rings) of this NRHP-eligible archaeological site. OHV access also increases dust in the cave. This dust is clinging to the cave walls and obscuring pictographs. OHV use is also a concern at other locations within the Black Canyon WSA. The practice of placing permanent, bolted rock climbing routes at several locations in the WSA also threatens archaeological sites.

The IDT recommended that this area be considered during the RMP planning process as an ACEC instead of an RNA (as was proposed in 1983) which would better protect both botanical and cultural resources.

The primary reason for consideration as an ACEC/RNA would be to protect cultural values. An ACEC that corresponds to the WSA boundary (approximately 5,225 acres) would allow the Upper Snake FO to actively protect and manage Jackknife Cave and other archaeological sites, as well as botanical resources, located within the ACEC. The Upper Snake FO would propose to install OHV barriers below Jackknife Cave, stabilize the floor of the cave, reduce dust accumulation on the walls and rock art, and install a visitor register in the cave's entrance. Registers have discouraged vandalism at similar rock shelters elsewhere in the United States. The proposed ACEC is shown in **Figure A-25, Appendix A–Maps.**

Proposed Middle Canyon Alluvial Fan RNA

The proposed Middle Canyon Alluvial Fan RNA is located at the southern end of the Lemhi Range just west of the Black Canyon WSA and about 6 mi north–northeast of Howe, Idaho. In 2004, this site was proposed by the NPS for designation as an NNL. The IDCDC prepared an evaluation report that is being reviewed by the NPS (Rust 2005). This alluvial fan was nominated for consideration as an RNA by Charles Wellner of the INACC in 1978 (Caicco and Wellner 1983e).

The Middle Canyon Alluvial Fan was chosen for consideration to represent salt desert shrub vegetation in very good condition. Although sagebrush/grass communities can be found within the area, the predominant vegetation is salt desert shrub. The condition of the vegetation ranges from fair to excellent, but overall, it is considered to be very good. The condition of the salt desert shrub community is considered to be the best in Idaho. The sagebrush/grass communities are dominated by black sagebrush and bluebunch wheatgrass. They are found on the upper and middle portions of the alluvial fan and adjacent to salt desert shrub types in the drainage channels on the lower portions of the fan. The salt desert shrub types are dominated by shadscale and include varying amounts of bottlebrush squirreltail (*Elymus elymoides*) and Indian ricegrass (Caicco and Wellner 1983e).

Three type 3 sensitive plants, Lost River milkvetch, Lemhi milkvetch, and spreading gilia (*Ipomopsis polycladon*) potentially occur within the boundaries of the proposed RNA (IDCDC 2007b). Type 3 plants are globally rare with moderate endangerment factors. Their global rarity and inherent risks associated with rarity make them imperiled species (BLM 2003a). Hooker's buckwheat is a rare, State-listed sensitive plant that potentially occurs within the boundaries of the proposed RNA (IDCDC 2007b).

The area is easily accessible by an unpaved road that approaches the mouth of the canyon from the south. The area has recreational value only as an access to Middle Canyon and for hunting. Livestock grazing by sheep occurs within the site in the Bernice allotment. The area is considered to be crucial antelope, mule deer, and sage-grouse winter range (Caicco and Wellner 1983e).

The IDT visited the site in 2007 to determine if the Middle Canyon alluvial fan met the criteria of relevance and importance for consideration as an RNA during the RMP planning process. The salt desert shrub community was found in good condition and was very similar to other adjacent communities, indicating that it is not rare or unique in southeast Idaho, particularly in the Little Lost Valley. Several pockets of cheatgrass could pose a threat of spreading throughout the area. The Middle Canyon alluvial fan did not meet any of the relevance criteria, which disqualifies the area from further consideration as an RNA. The area is currently being considered by the NPS for designation as an NNL, and BLM may consider developing management direction based on this potential NNL designation during the planning process.

Proposed Badger Creek ACEC

The proposed Badger Creek ACEC is located in the Little Lost Valley approximately 23 mi northwest of Howe, Idaho. Badger Creek is a perennial stream that flows for 5.5 mi on public lands before entering the Little Lost River on private land. It was identified for consideration as an ACEC by BLM personnel in 1991.

Badger Creek was chosen for consideration because of its unique limber pine community, which are rare west of the Continental Divide and even more rare at low elevations (Rosentreter 1991). There is only one other stand in Idaho that is growing at a low elevation (on private land in the Pahsimeroi Valley), and that population is declining. Limber pines are primarily located at the timber line in the Birch Creek/Lemhi Valleys, Little Lost/Pahsimeroi Valleys, Big Lost/Round Valleys, and the Copper Basin area west of the divide. However, the geographic area where Badger Creek is located has the cool, dry climate that limber pines prefer. The Badger Creek population is very important and may be considered by botanists to provide genetic diversity for disease-resistant strains in the future, as white pine blister rust is infecting present populations in the west and causing a species decline (Rosentreter 1991).

The microclimate associated with the steep, deeply incised channel provides a unique opportunity for limber pine to flourish at Badger Creek. A 1991 inventory of 137 trees showed 52% of them to be seedlings and saplings. The seedlings and saplings were growing at higher distances above the creek than young and mature trees, indicating that the habitat size is increasing (BLM 1991a,b).

When consulted about the limber pine population along Badger Creek in 1991, Dr. Paul Hansen of the Montana Riparian Association stated that limber pine community types along desert streams are quite rare. He had never encountered such a community as a dominant riparian type along any stream. He also felt that such a rare plant community would be impossible to effectively mitigate if any action caused its demise (Hansen 1991).

In a later consultation with Dr. Robert Mosely of the IDFG, he stated that in his experience, the limber pine community along Badger Creek is quite unique. He knew of two other low-elevation limber pine stands in Idaho, but both are sub-irrigated from springs. Badger Creek is the only site he knew of where limber pine is associated with free-flowing water. He also stated that the Badger Creek riparian zone has a high biodiversity value (Mosely 1991).

The area is easily accessible by several unpaved roads that approach and run parallel to various sections of the stream. Livestock grazing occurs along the stream within the Uncle Ike allotment. The presence of several old stumps indicates that limber pines and junipers were harvested in the past. However, both the pine and juniper communities appear to be viable, as all age classes are present. An old mine is located on the NFSL upstream of the BLM reach. The State of Idaho holds a minimum instream flow water right on Badger Creek on behalf of the BLM.

The Upper Snake FO RMP IDT visited the site in 2007 to determine if Badger Creek met the criteria of relevance and importance for formal designation as an ACEC. Livestock were not found to be impacting the limber pine community, because access to these areas was limited by thick water birch and juniper. In a few locations, livestock could access the riparian area for shade or water, but there was no reduction of age diversity or overall numbers of trees observed in these areas. The limber pine community was found vigorous and healthy, and in good to excellent condition.

Although Badger Creek met the appropriate relevance and importance criteria to be formally considered as an ACEC during the planning process, it was found to not require additional management outside of current management to maintain the integrity of the limber pine community. Therefore, the IDT recommended that Badger Creek not be considered as an ACEC through the RMP planning process.

Proposed Cedar Butte ACEC

The proposed Cedar Butte ACEC is located in the Big Desert about 4.25 mi southwest of Atomic City, Idaho. Approximately 115 acres of the east side of the proposed ACEC are in the Cedar Butte WSA, a lava flow. Cedar Butte is an open, weathered volcanic cinder cone that was formed about 1.0 M years ago. It is much older than other nearby prominent buttes on the Snake River Plain. Big Southern Butte is 300,000 years old, and Middle and East Buttes are 600,000 years old. The Cedar Butte WSA lava flow is about 10,800 years old. The butte was nominated for ACEC consideration by the IDFG and the Idaho Committee for Idaho's High Desert (BLM 1992b).

Cedar Butte was chosen for consideration because of its high cultural, wildlife, range, and recreational values. The dominant cover of Rocky Mountain juniper (*Juniperus scopulorum*) provides good security and thermal cover for wildlife. A 1991 elk study showed that the Cedar Butte area is summer range for about 101 elk between March and September (Idaho National Engineering Laboratory 1991). This area, particularly the Cedar Butte lava flow, is crucial elk calving range. Elk water at night at the Cedar Butte wildlife guzzler. The herd usually returns to the Lemhi Mountains by the end of September. Cedar Butte has sage-grouse leks, nesting areas, and wintering areas. It also offers good habitat for ferruginous hawk nesting, mule deer, antelope, coyote, cottontail rabbits, jack rabbits, badgers, burrowing owls, passerine birds, and a variety of other species (BLM 1992b).

Cedar Butte has cultural resource values and is considered a sensitive area. Cedar Butte obsidian provided southeastern Idaho's Native Americans a source of material for making stone projectile point. The butte's lithic scatters and pottery shards indicate locations of campsites and stone making areas utilized by past generations of Native Americans. There are also remnants of Euro-American mining claims and emigrant trails. The Upper Snake FO has identified unauthorized surface collection of lithic artifacts as a Cedar Butte cultural resource management problem (BLM 1992b).

The butte has scenic values with its juniper woodland and views of Big Southern Butte and the Cedar Butte lava flow. The WSA offers naturalness, solitude, and primitive recreation opportunities. The area is easily accessible by a relatively good unpaved four-wheel drive road system that branches out across much of the butte. The butte is a popular motorcycling and snowmobiling area. Several new unauthorized roads and trails have been formed from OHV use and four-wheel drive vehicles. This has resulted in displacement of wildlife, increases in soil erosion, vegetation degradation, and disturbance of cultural sites. The area is popular for sage-grouse, antelope, and deer hunting. Livestock grazing occurs within the site in the Cedar Butte allotment. Livestock grazing during drought periods results in forage competition between livestock and wildlife (BLM 1992b).

The Upper Snake FO RMP IDT visited the site in 2007 to determine if Cedar Butte met the criteria of relevance and importance for consideration as an ACEC. Although Cedar Butte met the appropriate relevance and importance criteria, it was found to not require special management outside of current practices to maintain the integrity of its resource values. Although road closures are needed to prevent further degradation of the area, they can be implemented through the CTTM process without an ACEC

designation. Therefore, the team recommended that Cedar Butte not be considered for formal designation as an ACEC through the planning process.

Proposed Big Southern Butte RNA

The proposed Big Southern Butte RNA is located in the Big Desert about 10 air miles southwest of Atomic City, Idaho. It is also located within the boundaries of the Big Southern Butte NNL. The dominance of this feature makes it visible from a great distance, as the slopes of the butte rise abruptly from the surrounding plains. The butte was used as an important landmark by pioneers. While the butte's summit offers spectacular views of much of eastern Idaho, it is not heavily visited because of the butte's overall remote location and the necessity of a high clearance vehicle to travel the road to the summit. The southeast third of the butte (586 acres) was nominated for consideration as an RNA by BLM personnel in 1983 during a meeting with Edwin Tisdale and Charles Wellner of the INACC (Caicco and Wellner 1983f).

Recent geologic maps indicate that the butte is younger than the surrounding lava flows. In addition to Big Southern Butte being an outstanding geologic feature of the Snake River Plain and a site of historical significance as a landmark during the days of the pioneers, it is also a significant biological feature. Towering approximately 2,500 ft over the surrounding plains, it includes vegetation that ranges from sagebrush steppe through forest communities. The proposed site was chosen for consideration to represent as much of this variety as possible while, at the same time, keeping conflicts with other values to a minimum. Both mountain big sagebrush and black sagebrush-dominated communities are present among the sagebrush types. Bluebunch wheatgrass and Idaho fescue are the dominant understory components (Caicco and Wellner 1983f). Obscure phacelia (*Phacelia inconspicua*) is a BLM type 2 sensitive species that occurs on the butte (IDCDC 2007b). A type 2 sensitive plant has a high likelihood of being listed in the foreseeable future resulting from its global rarity and significant endangerment factors (BLM 2003a).

The top of the butte is accessible via a steep, rocky, two-track, four-wheel-drive road that winds its way for 5 mi to a lookout tower that has historically been used to locate fires along the northern edge of the ESRP. A series of radio towers at the top of the butte are used by the BLM and USFS for communication purposes. The lookout tower and radio towers are just outside and to the west of the proposed RNA. The perimeter of the butte is easily accessible by an unpaved road that circles around its base. Livestock grazing occurs on the butte within the Big Butte and Cinder Cone allotments. However, usage within the proposed area is generally light as a result of steep slopes and lack of water. Several mining claims have been established throughout the butte. An old stage station used to be located at the foot of the butte.

The Upper Snake FO RMP IDT visited the site in 2007 to determine if Big Southern Butte met the criteria of relevance and importance for formal designation as an RNA. Although Big Southern Butte met the appropriate relevance and importance criteria to be considered as an RNA, it was found to not require special management outside of current practices to maintain the integrity of its resource values. Therefore, the IDT recommended that Big Southern Butte not be considered further as an RNA through the RMP planning process.

Proposed Teton River ACEC

The proposed Teton River ACEC is located approximately 6 mi northeast of Newdale, Idaho. The approximately 3,412 acres of BLM-managed public lands are intermixed with approximately 5,864 acres

of lands managed by the BOR. The Teton River and its major tributaries (Canyon, Bitch, and Badger creeks) were nominated for consideration as an ACEC in 2008 by the Teton Regional Land Trust, IDFG, BOR, and BLM personnel. The primary reason for the nomination is to protect scenic values, the riparian and upland communities, and important aquatic and wildlife habitat.

On June 5, 1976, the newly constructed Teton Dam structure failed within days of filling for the first time, resulting in significant physical and biological changes in the Teton River canyon. The rapid draining of the reservoir resulted in numerous landslides and habitat loss (BOR 2006). The canyon walls were sloughed and pools and gravel/sediment dams were created across the river. The Omnibus Public Land Management Act of 2009 was signed into law in March 2009 (P.L. 111–11) and authorizes funding for studies to determine the feasibility of rebuilding the dam.

The Teton Canyon provides an important stronghold for YCT. Canyon and Bitch creeks appear to be especially important spawning and rearing tributaries. The population of YCT in the Teton River upstream of the canyon in the Teton Valley has declined significantly. Whirling disease, loss of connectivity, and other factors appear to have caused the decline. The population in the Teton Canyon may be the last viable population in the drainage (Saban 2005).

The Teton Canyon and the adjacent BLM-managed public lands and BOR lands on the rim provide habitat for numerous wildlife species. Mule deer, white-tailed deer, moose, elk, mountain lion, river otter, beaver, and coyote are all regular visitors or seasonal residents. Many species of waterfowl, especially Canada geese, use the canyon at various seasons. Trumpeter swans are common winter inhabitants. Bald eagles nest in the canyon, and peregrine falcons are likely present. Columbian sharp-tailed grouse are found along the rims, and ruffed grouse are likely found in the forested north slopes mainly above Canyon Creek (Saban 2005).

The rims above the Teton Canyon are among of the most important mule deer wintering areas in eastern Idaho. Within the canyon, the south- and west-facing slopes provide the most important winter habitat during most winters. However, during mild winter conditions, the aspen and conifers on the north-facing slopes are used extensively (Saban 2005).

One of the features of Teton Canyon that makes it so valuable for many wildlife species is its relative lack of human activity. This contributes significantly to the security of elk and deer wintering in the canyon, bald eagle nesting, and trumpeter swan use of the river in winter. In areas where people are able to access the canyon or rim areas, significant big game poaching has occurred. This is a problem especially in winter when large antlered deer and elk are in the canyon and nearby rim areas. The IDFG has encouraged both the BOR and the BLM to consider a winter closure to human entry, especially along the rim on the north side of the canyon (Saban 2005).

A productive mountain shrub community remains in the areas that were not inundated by the reservoir. However, the habitat loss that occurred as a consequence of the dam failure has resulted in the need to re-establish the shrub component, particularly antelope bitterbrush and sagebrush, for mule deer. In the riparian and floodplain areas along the river, woody vegetation such as willow, dogwood, and cottonwood are recovering very slowly. Leafy spurge, Canada thistle (*Cirsium arvense*), musk thistle, and tamarisk (*Tamarix spp.*) are all known to be present in the canyon (Saban 2005).

There are 12 cultural resource sites located within the proposed ACEC. Rockshelters in the Teton River area have produced very early type projectile points. Sites in the area could provide evidence of over 10,000 years of Native American residence and activity. There are also ranches and a rail line that relate a story of pioneer Euro-American life in the Teton River Valley. There are also NRHP-eligible prehistoric and historic cultural resources found in the proposed ACEC.

Difficult accessibility as a result of the steep canyon and adjacent private land precludes high recreational use from occurring, but recreation demands are increasing as growth soars in nearby communities. Two large parcels of private land on the canyon rim have been subdivided for home site development, and a golf course is planned for each subdivision. Recreation activities that occur in the proposed ACEC include fishing, white water rafting, kayaking, hiking, and hunting. Some limited outfitted fishing use also occurs.

The Upper Snake FO RMP IDT visited the Teton Canyon in 2005 and determined that it is eligible for NWSRS designation. The IDT reconvened in 2008 to determine if the Teton River proposed ACEC met the criteria of relevance and importance. The IDT recommended that the Teton Canyon be considered as an ACEC through the RMP planning process. The proposed ACEC is shown in **Figures A-25 and A-27, Appendix A–Maps.**

Proposed Main Snake River ACEC

The proposed Main Snake River ACEC begins near Firth, Idaho, and includes all BLM-administered public lands located adjacent to the river to Tilden Bridge (approximately 20 mi downstream), totaling approximately 2,765 acres. This area was nominated for consideration in 2008 by BLM personnel. The primary reason for consideration is to protect the cottonwood ecosystem, scenic values, and important aquatic and wildlife habitat.

The Snake River riparian ecosystem is dependent on the vast floodplain created by the river flows. The cottonwood gallery forest is one of the most bio-diverse ecosystems in Idaho. It supports a tremendous variety of wildlife and is a major factor in dissipating the effects and energy of high flows.

The width of the riparian zone varies from 0.25–0.5 mi. Vegetation consists of narrowleaf cottonwood, peachleaf willow (*Salix amygdaloides*), with lesser amounts of box elder, red-osier dogwood, Rocky Mountain juniper, and the introduced Russian olive (*Elaeagnus angustifolia*). The understory and ground cover of forested communities include skunkbrush sumac (*Rhus trilobata*), Wood's rose (*Rosa woodsii*), golden currant (*Ribes aureum*), common chokecherry, western wheatgrass, Kentucky bluegrass (*Poa pratensis*), Basin wildrye (*Leymus cinereus*), and foxtail barley (*Hordeum jubatum*).

Emergent wetlands occupy island and gravel bars on the river and are flooded regularly during spring high flows. The wetlands are dominated by cottonwood and sandbar willow (*Salix exigua*). The sagebrush grassland type is a relatively degraded area as a result of past agricultural practices. Weed species in the area include cheatgrass, mullein (*Verbascum thapsus*), Canada thistle, musk thistle, and quackgrass (*Elymus repens*).

Sediment deposition and water discharge patterns are important for riparian vegetation and survival. Floods were the dominant disturbance factor on the Snake River riparian ecosystem prior to the construction of its six upstream dams, and most of the cottonwood forest established on sediment

deposited during large floods. Riparian species such as cottonwoods and willows have evolved with the episodic flooding, and the ecosystem greatly depends upon periodic floods to perpetuate floodplain deposition for regeneration areas. Species such as cottonwood and willow that require bare, moist, mineral soil in sunlight for regeneration are declining because of flood control. The smaller and less frequent floods since the construction of the upstream dams (with the exception of the 1997 flood) have created fewer areas conducive to cottonwood and willow regeneration, and the total forest area is shrinking and becoming proportionately older.

The Main Snake River provides habitat for a wide diversity of wildlife species. The cottonwood/shrub type provides nesting and foraging habitat for a number of raptors, especially great horned owls, red-tailed hawks, Cooper's hawks, Swainson's hawks, American kestrels, and bald eagles. Waterfowl species include Canada geese, mallards, green-winged teal, and wood ducks. The area is also prime nesting habitat and cover for upland game birds such as pheasant and Hungarian partridge, and wild turkeys use the site year-long. In addition, the area is habitat to many small land birds, including such riparian-dependent species as song sparrow, yellow warbler, yellow-billed cuckoo (a candidate for federal listing as T&E), and willow flycatcher. Mule deer and white-tailed deer are widely distributed throughout the river corridor year-long. Many species of non-game mammals, including mink, beaver, and muskrats also use the area.

The Main Snake River has a relatively diverse fishery, which includes rainbow trout, YCT, brown trout, mountain white fish, Utah chub, longnose dace, speckled dace, redside shiner, Utah sucker, mountain sucker, and common carp. Mountain whitefish is the dominant species in this reach, although good populations of rainbow and brown trout are also present. The endangered Utah valvata snail is also present in this reach of the river.

The Main Snake River provides an important source of water for agricultural land. Recreation use is limited as a result of the surrounding private ownership pattern. Access is available to public lands only by boat and by hiking along the riverbank. The majority of recreation use is hunting and fishing; however, other popular opportunities include hiking, camping, boating, horseback riding, and observing wildlife. Commercial outfitters and guides provide some additional fishing opportunities. The BLM administers 15 active grazing allotments within the proposed Main Snake ACEC.

The Upper Snake FO RMP IDT met in 2008 to determine if the Main Snake River proposed ACEC met the criteria of relevance and importance for consideratrion as an ACEC. The IDT recommended that the Main Snake River be considered as an ACEC through the RMP planning process. The proposed ACEC is shown in **Figure A-25 and A-27, Appendix A–Maps.**

Proposed ACEC Summary

Based upon the IDT field visits and completion of the relevance and importance criteria, the following proposed ACECs will be considered further in the planning process:

- SW Lemhi Range ACEC
- Teton River ACEC
- Main Snake River ACEC.

2.27.2. Wilderness Study Areas

BLM began the wilderness review in 1976 in accordance with the requirements of Section 603 (c) of FLPMA (43 U.S.C. 35 § 1701 et seq.). The Act mandated that within 15 years, BLM would inventory and study its public lands for wilderness suitability, and based on the results of the study, the Secretary of Interior would forward the Agency's wilderness recommendations to the President.

For the Upper Snake FOA, the studies came in the form of wilderness EISs because approved LUPs were already in place. Since wilderness recommendations resulted from the EISs, and forwarded, as previously stated, there are no RODs. However, any public lands recommended for wilderness are currently managed as if they were wilderness areas. As such, some uses, e.g., timber harvest and OHV access, currently are restricted until Congress acts on the Idaho wilderness recommendations.

Minimum standards for the evaluation of BLM-administered public lands in Idaho were set by Congress in Section 2 (c) of the Wilderness Act of 1964 (16 U.S.C. 23 § 1131 et seq.). This section defined wilderness as an area of undeveloped federal public land,

> *"…retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."* (16 U.S.C. 23 § 1131 et seq.)

In addition to the Wilderness Act, each WSA was further evaluated, with BLM's wilderness study guidance (47 FR 23, 1982), to compare the area's overall wilderness quality with its multiple use value for other purposes, such as mining, grazing or timber harvest as authorized by FLPMA. A summary of the findings for each WSA can be found in the site-specific analysis for each WSA.

Idaho BLM recommended wilderness designation suitability for the WSAs, or portions of WSAs, where the overall wilderness quality is high and represents the best examples of ecosystems, landforms or land offering special geological or scientific values within the state. BLM found some WSAs, or portions of those WSAs, non-suitable where duplicate features are common in the NWPS, were of relatively low wilderness quality when compared to their values for other multiple uses, or where wilderness qualities are better represented by other WSAs in Idaho. While the BLM may have made a recommendation, all WSAs remain under Interim Management Policy until Congress either designates or releases them.

The Idaho Wilderness Study Report (BLM 1991c) is a comprehensive study of public lands in Idaho by the BLM regarding the suitability of lands for wilderness designation. The report provides a summary of the WSAs located within the Upper Snake FOA.

The Great Rift WSA was originally identified within the Upper Snake FOA; however, it is now part of the Craters of the Moon National Monument and Preserve, established in August 2002. The area was

administratively transferred to the BLM Shoshone FO in 2000. Subsequently, the boundary was changed, on October 1, 2004, to reflect the monument/reserve residing totally within the Shoshone District.

There are 11 WSAs (totaling approximately 183,490 acres) located within the Upper Snake FOA as identified in the four current LUPs, in the Idaho Wilderness Study Report (BLM 1991c), and as shown in **Table 2-51**.

Natural and use conditions of the WSAs have remained largely the same since they were designated in the 1980s except for Sand Mountain, Appendicitis Hill, and White Knob WSAs because of the increased presence of OHV activities. Recreation use in the Sand Mountain WSA has increased from less than 5,000 visitors in the 1980s to over 220,000 visitors in 2007. The majority of use in Sand Mountain WSA is by motorized recreationists using the 10,000 acres of open sand dunes within the WSA.

Table 2-51. WSAs within the Upper Snake FOA.

Wilderness Study Area (WSA) Name	WSA Number	WSA Public Lands Acreage	WSA Public Lands Acreage Upper Snake FOA	Suitability Recommendation
Appendicitis Hill	ID-31-14	21,900	21,900	Non-suitable
White Knob Mountain	ID-31-17	9,950	9,950	Non-suitable
Hawley Mountain	ID-32-03	15,510	15,510	Non-suitable
Black Canyon	ID-32-09	5,400	5,400	Non-suitable
China Cup	ID-33-02	160	160	Non-suitable
Cedar Butte	ID-33-04	35,700	35,700	Non-suitable
Hell's Half Acre	ID-33-15	68,760	68,760	Suitable
Snake River Islands	ID-34-02,03,04	872	872	Non-suitable
Sand Mountain	ID-35-03	21,740	21,740	Non-suitable
Henry's Lake	ID-35-77	350	350	Suitable
Burnt Creek	ID45-12	24,980	3,250	Non-suitable
Total	–	205,322	183,592	–

Appendicitis Hill

The WSA is primarily natural but has numerous dead-end motorized roads and trails. These roads and trails are used primarily by big game hunters in the fall. The WSA does not contribute significant solitude and primitive recreation opportunities in an area of Idaho already abundant in wilderness experiences. There are management concerns on controlling human-caused impacts (roads and trails) by users because of the lack of natural barriers. With the area possessing the minimum characteristics to qualify as a WSA and having wilderness manageability concerns, the area has been recommended as non-suitable for wilderness (BLM 1983, 1986c).

White Knob Mountain
The WSA is primarily natural and has opportunities for primitive and unconfined recreation uses. However, these wilderness characteristics are considered to be marginal compared to other roadless areas within the same geographical area. The WSA has numerous dead-end roads and trails used primarily by big game hunters. With natural barriers lacking to prevent increased vehicle ways and other human-caused impacts, the area has been recommended as non-suitable for wilderness (BLM 1983, 1986c).

Hawley Mountain
The WSA is essentially natural with negligible imprints, even though it has 13 mi of vehicle trails. These vehicle trails are used primarily by big game hunters in the fall and livestock permittees throughout the year. The WSA's solitude and primitive characteristics are considered marginal compared to other roadless areas in the area. Management concerns of potential harvest of timber resources and OHV accessibility, resulting from the lack of natural barriers on the existing and potential new vehicle trails, have lead BLM to recommend the WSA as non-suitable for wilderness (BLM 1986d).

Black Canyon
The small WSA is predominantly natural though opportunities for solitude and primitive recreation are judged to be less than exemplary. The WSA's landscape is characterized as rocky canyons, massive cliffs, and thrust faults. The lower slopes and canyon bottoms contain sagebrush, forbs, and grasses typical of low moisture, high desert environments. Patches of juniper trees are found throughout the area and small stands of Douglas-fir grow at higher elevations. The WSA receives most of its recreation use in the spring and fall. During these times rock climbers use the numerous canyon roads and ways to get to limestone walls to climb. In the fall hunters use these same roads and ways to hunt big and upland game.

Prehistoric and historic Native American groups have used the canyons, cliffs, and alluvial benches of the WSA. Native American paintings of animals, human figures, and geometric forms are found in rockshelters and on exposed canyon walls. There is also evidence of Euro-American use of the area's canyons. The "Iron Door Site" is a unique site that may have been a bomb shelter. Another cave in the WSA was occupied by a man seeking to escape the urban pressures of Howe, Idaho.

The WSA is recommended as non-suitable for wilderness because of manageability concerns regarding the ability to keep motorized use from extending existing vehicle routes in the small-sized WSA (BLM 1986d). The WSA also does not contribute significant solitude and primitive recreation opportunities in an area of Idaho already abundant in wilderness.

China Cup
The China Cup WSA (approximately 160 acres) qualified as a WSA when FLPMA was passed on November 1, 1976. Before that date, the site was designated as an RNA. The WSA is a small tephra, or scoria cone, that is almost a perfectly circular cone 1,500 ft, in diameter with a 100-ft deep crater. The WSA was recommended as non-suitable for wilderness (BLM 1991c) because it did not meet the size requirements of the Wilderness Act (16 U.S.C. 23 § 1131 et seq.).

Cedar Butte
A 35,700-acre lava field that is predominantly natural in appearance. The WSA has only a few vehicle ways that enter into it as well as a few rock dumps that are along the WSA boundary. The WSA lacks

topographic and physical features that attract primitive recreation use and outstanding opportunities for solitude. The WSA is recommended as non-suitable for wilderness (BLM 1986d) because the quality of wilderness values were not considered to be high enough to merit designation. There are other recommended WSA lava flows within 40 mi that better represent the ecosystem and its outstanding opportunities for solitude and primitive recreation characteristics.

Hell's Half Acre

The WSA is part of a large lava field that has lava flows at the surface that are between 4,000 and 5,200 years old. The lava flows resembles a flat moonscape that is interrupted by deep crevices, fissures, ridges, depressions, and sparse vegetation. The WSA's large size and rugged volcanic landscape offer excellent solitude opportunities as well as outstanding dispersed recreation opportunities of hiking, camping, and caving in a rugged environment. The 68,760-acre WSA is recommended for wilderness designation (BLM 1986d). Within the WSA there are 2,560 acres of IDL-administered public land.

Snake River Islands

The Snake River Islands WSA is located in southeastern Idaho within a 25-mi segment of the South Fork of the Snake River between Swan Valley and Heise, Idaho. The WSA contains 39 islands that total 872 acres of public lands. The Idaho Intensive Wilderness Inventory (BLM 1980) originally listed the islands as three separate WSAs, known as Table Rock, Pine Creek, and Conant Valley. Because of the many similarities among the three WSAs, they have been combined and are now referred to as the Snake River Islands WSA.

The islands are characterized by dense riparian vegetation. An overstory of middle-age cottonwoods occurs on the larger islands with an understory of forbs, grasses, and scattered shrubs. The smaller islands that do not support cottonwoods trees are covered with willows, Russian Olives, alder, and red-osier dogwood. The WSA is predominantly natural with most of the islands free of human imprints. There are no designated camp areas identified on the WSA islands to protect the naturalness of the islands. Livestock grazing does not occur on the WSA, yet litter and fire rings are found on some of the larger islands. Opportunities for solitude vary and are affected by the size and vegetative cover on a particular island. Opportunities for primitive and unconfined recreation are numerous and of high quality. Fishing from and around the islands is the most popular activity and is directly related to the excellent YCT fishery in the South Fork. The most important supplemental value of the islands is as wildlife habitat. The islands provide sites for bald eagle nesting and roosting and hunting sites for other raptors. Elk depend on the islands for forage in the winter, while deer and moose use them year-round.

The 39 wilderness study islands in the South Fork were recommended as unsuitable for wilderness designation (BLM 1985, 1988c). BLM recommended the WSA islands as non-suitable for wilderness because the islands cannot be easily be managed as wilderness and wilderness values are being impaired by unnatural water flow regulation, motor traffic, recreation use, and other outside influences. The islands are within the designated Snake River ACEC and Snake River SRMA boundaries.

Sand Mountain

The WSA is part of a large sand dune complex that receives over 220,000 visitors a year. Since becoming a WSA, recreation use has increased over 1000%, mainly in the form of motorized recreation. The 21,740-acre WSA has over 10,000 acres of open sand within its boundary in which the majority of recreation use occurs. A portion of the WSA is within the Nine-Mile Knoll ACEC and the St. Anthony

Sand Dunes RNA. Naturalness and opportunities for solitude and primitive unconfined recreation are less than exemplary. These wilderness values are adversely affected by influences outside the WSA. They include extensive farming activities and developed recreation vehicle parks adjacent to the WSA's eastern and southern boundaries, and frequent farm–to–market vehicle traffic along the southern boundary county road. Human activities, equipment, and buildings can be seen and heard, detracting from the visitor's perception of naturalness or solitude experience. The WSA is recommended as non-suitable for wilderness because of minimum wilderness characteristics and manageability concerns (BLM 1985, 1988c).

Henry's Lake

The Henry's Lake WSA is a 350-acre parcel of public land adjacent on two sides to the USFS-managed 16,800-acre Lion's Head roadless area. The other two sides of the parcel are adjacent to private land that has been developed for recreation home sites. The WSA is within a small perennial stream drainage north of Henry's Lake. The vegetation is lush along the creek bottom with Wood's rose, quaking aspen, willows, serviceberry, and snowberry. The slopes have scattered stands of Douglas-fir, lodgepole pine, and quaking aspen intermixed with sagebrush, antelope bitterbrush, and grasses. Wildlife species found in the WSA include black bear, elk, moose, deer, and a variety of birds. The area lies within habitat where management for grizzly bear is given priority over other uses. The WSA is closed to OHV use. The WSA receives minimum human activity because of its small size and lack of public access from the southern boundary. The recommendation is to designate 340 acres as suitable for wilderness and to release 10 acres as non-suitable for wilderness in the EIS for Small Wilderness Study Ares Statewide (BLM 1989). The WSA could not stand on its own as wilderness because of its small size. It is recommended for wilderness only in conjunction with the adjacent 16,800-acre Lion's Head roadless area, which has also been recommended for wilderness designation by the USFS.

Burnt Creek

The WSA is located 35 mi northwest of Arco, Idaho. The 24,980-acre WSA is administered by both the Challis (21,730 acres) and Upper Snake FOs (3,250 acres). A portion of the WSA lies adjacent to the 116,000-acre Borah Peak roadless area designated by the USFS. The Upper Snake FO portion of the WSA is 3,250 acres in size and lies within the lower Dry Creek drainage, which is predominantly natural but has some roads and trails and other human-made intrusions. The general character of the landscape is open sagebrush and grass and rolling hills similar to thousands of acres of adjacent lands outside the WSA. The area's opportunities for solitude and primitive unconfined recreation are not rated as outstanding. Use occurring on boundary and cherry-stem roads and lack of vegetative screening is evident to the visitor. The 3,250 acres of the WSA within the Upper Snake FOA is recommended as non-suitable for wilderness along with 13,430 acres within the Challis FO boundary (BLM 1983, 1986c). A portion of the WSA (8,300 acres) that lies within the Challis FO boundary and adjacent to the Borah Peak roadless area is recommended suitable for wilderness (BLM 1983, 1986c).

2.27.3. Wild and Scenic Rivers

The Wild and Scenic Rivers Act of 1968, directs federal agencies to evaluate resource values of rivers that may qualify for designation as components of the NWSRS and to recommend suitable rivers for designation by Congress. The heart of river protection, and the essence of the Act, is protection of free-flowing character. Free-flowing is defined in the Act as,

> *"…existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway. The existence, however, of low dams, diversion works, and other minor structures at the time any river is proposed for inclusion in the national wild and scenic rivers system shall not automatically bar its consideration for such inclusion...."* (16 U.S.C. 28 § 1273(b))

To protect free-flowing character the FERC (which licenses nonfederal hydroelectric projects) is not allowed to license construction for dams, water conduits, reservoirs, powerhouses and transmission lines, or other project works on, or directly affecting, wild and scenic rivers. Other federal agencies may not assist by loan, grant, license, or otherwise any water resource project that would have a direct and adverse effect on the values for which a river was designated.

Every river in the NWSRS must be managed in such a way as to protect and enhance the values that made it eligible for the NWSRS, but not limit other uses that do not substantially interfere with public use and enjoyment of these values.

Wild and Scenic Rivers Study Process

The three phases of a WSR study are eligibility determination, classification analysis, and suitability assessment. River or stream segments must be found both eligible and suitable to be recommended for designation in the NWSRS, and only Congress or the Secretary of Interior may designate recommended suitable segments.

Eligibility Determination

Eligibility determination, the first phase of the study process, is an analysis to evaluate whether or not a river is eligible to be tentatively considered for WSR designation. To be eligible for designation, a river must be free-flowing and contain at least one outstandingly remarkable value that is scenic, recreational, geological, aquatics or wildlife related, historical, cultural, botanical, hydrological, paleontological, or scientific. Conditions that may also fulfill the free flowing requirement include the following:

- a river below a dam or with water diversions may still be eligible,
- a river need not be "boatable or floatable" to be eligible, and
- a river is not constrained by its volume to be eligible. Flows are sufficient if they sustain or complement the outstanding remarkable value for which the segment would be designated. As such, intermittent and ephemeral streams may be eligible.

Whether or not a river area contains outstanding remarkable values is an evaluation made by FO personnel and then documented in the eligibility study report. To be considered as outstandingly remarkable, a river-related value must be a unique, rare, or exemplary feature that is significant at a comparative regional or national scale. While the spectrum of resources that may be considered is broad, all values should be directly river related. That is, they should have the following characteristics:

- be located in the river or on its immediate shore lands (0.25 mi on either side of the high mark on the river as dictated by 16 U.S.C. 28 § 1275(d)),
- contribute substantially to the functioning of the river ecosystem, and

- owe their location or existence to the presence of the river.

Once rivers are considered eligible as a result of applying the free-flowing and outstandingly remarkable criteria, river segments are assigned a tentative classification.

Classification Analysis

The second phase of the study is the classification analysis, which determines whether the river should be tentatively classified as wild, scenic, or recreational if it were designated by Congress. This terminology has caused frequent confusion because wild rivers are not necessarily fast-moving whitewater rivers, scenic rivers may not be noted for scenic values, and recreational rivers may not receive heavy public use. The labels actually refer to the degree of development along the river. The definitions of wild, scenic, and recreational from the Act are:

- Wild river areas—Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
- Scenic river areas—Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
- Recreational river areas—Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Rivers in the NWSRS are often referred to as "wild and scenic rivers" without regard to actual classification. This is acceptable when speaking of the NWSRS in general, but the specific legal classification is an important distinction as it has a direct effect on how the river is administered and whether certain activities on federally managed public land within the boundaries are permissible. Regardless of classification, each designated river is administered with the goal of nondegradation and enhancement of the values which caused it to be designated.

The following sections present the Upper Snake FO's findings through the classification analysis phase for the FOA's eligible rivers/tributary segments, which are shown on **Figure A-25, in Appendix A–Maps**.

South Fork of the Snake River (South Fork)

The Medicine Lodge RMP (BLM 1985) determined that the South Fork from Palisades Reservoir to its confluence with the Henry's Fork, meets the eligibility criteria for possible inclusion to the NWSRS. This 61-mi stretch of the South Fork is also listed on the National Rivers Inventory (NPS 2009).

A re-assessment of the South Fork, completed in 2009, indicated that it is still eligible for inclusion in the NWSRS. The assessment was based on criteria established in BLM Manual 8351—Wild and Scenic Rivers, Policy and Program Direction for Identification, Evaluation, and Management (BLM 1993).

The South Fork is an outstanding remaining link in the Snake River System that is free-flowing. Even though the flows are regulated by Palisades Dam, the 61 mi to the confluence with the Henry's Fork are

unimpeded and unimpounded. Other rivers have been added to the NWSRS that are controlled by upstream and downstream reservoirs and some have been recommended for designation. A nearby example of this is the Snake River above Palisades Reservoir to Grand Teton National Park, which is controlled by the Jackson Lake Dam. As such, it was interpreted that Congress did not intend to exclude river segments because their flows are controlled by reservoirs; therefore, the South Fork would continue to qualify as free-flowing.

There are several unusual, unique, and exceptional values that can be described as "outstandingly remarkable" along the South Fork. Scenic vistas include pastoral settings back-dropped with mountain ranges, a spectacular canyon with sheer rock walls that open onto a mature flood plain, and densely vegetated islands and banks. The river corridor provides enjoyable and relaxing opportunities for motorized and non-motorized boating on swift flat water, fishing, hunting, camping, hiking, and nature study. These activities are enhanced by both outstanding scenery and fish and wildlife resources. The South Fork is one of Idaho's highest valued fisheries and is well known as a blue ribbon YCT stream. Canada geese and a variety of ducks nest along banks and on islands. The river's cottonwood galleries are considered Idaho's most important ecosystem (Boccard 1980). It provides critical habitat for nesting and wintering bald eagles and crucial habitat for wintering big game such as elk, deer, and moose. Prehistoric sites 8,000 years old have been documented along the river as well as historic evidence of early settlers and explorers to the region.

The South Fork is considered to be of sufficient length and flow to be managed as part of the NWSRS and the factors "free-flowing" and "outstandingly remarkable values" appear to be met or exceeded. This leads to the conclusion that the South Fork is eligible for inclusion in the NWSRS. The three eligible segments, and their preliminary classifications, from the study's classification analysis phase, are shown in **Table 2-52.**

Table 2-52. Preliminary wild and scenic river classification for the Upper Snake FOA-eligible river/tributary segments.

Eligble River/Tributary Segment	Preliminary Classification
South Fork Snake River	
Palisades Reservoir to Conant Valley Power Line	Recreational
Conant Valley Power Line to Riley Diversion	Scenic
Riley Diversion to Henry's Fork Confluence	Recreational
Teton River	
Felt Power Plant to Bitch Creek	Scenic
Bitch Creek to Spring Hollow	Scenic
Spring Hollow to Canyon Creek	Scenic
Canyon Creek to Dam Site	Recreational
Teton River Tributary	
Badger Creek to Teton River	Scenic
Bitch Creek to Teton River	Scenic
Canyon Creek to Teton River	Scenic

Upper Snake FOA Rivers

The Upper Snake FO RMP IDT evaluated 465 mi of rivers and streams within the Upper Snake FOA to determine whether or not river segments were eligible for inclusion in the NWSRS. Through the evaluation, seven additional river segments shown in **Table 2-52** met eligibility criteria and were preliminarily classified based on the type and degree of human development associated with the river and adjacent lands present at the time of the evaluation.

Once a determination of eligibility is made, the outstandingly remarkable values on which eligibility were based must be protected from impairment until a final suitability determination is made regarding designation. This is called interim management. The South Fork is currently under interim management because it is eligible.

Suitability Study

The final phase of the WSR study, the suitability assessment, consists of comparing alternative ways of managing the river. During this phase, the eligible river/tributary segments' outstandingly remarkable values are weighed with other public land resource values and uses. The suitability of a river depends on the managing agency's ability to resolve key issues such as public access, long-term protection of resources, and traditional resource uses.

Section 1276(d)(1) of the Wild and Scenic Rivers Act (16 U.S.C. 28 § 1271 et seq.) directs federal agencies to consider the potential of wild and scenic rivers in their planning processes. The Upper Snake FO will complete the suitability study for all rivers and streams found to be eligible during the RMP development process. Each eligible river segment will be evaluated for suitability or non-suitability to assess whether or not it is a potential candidate for inclusion in the NWSRS. If a river is found suitable for inclusion, a report is prepared for congressional consideration. After considering the report, congressional or state legislative action, or approval by the Secretary of the Interior, is required for actual designation and final classification of suitable river segments. Until such time that the actual designation and final classification are made, the BLM is required to manage the river and associated public lands to maintain their potential for designation under the Act. River segments that do not pass the suitability test and are found non-suitable are released from interim management and the NWSRS-designation process.

2.27.4. National Recreation Trails

The Cress Creek Nature Trail was designated a National Recreation Trail on June 3, 2005, after the completion of trail improvements and installation of interpretive signs. Cress Creek Nature Trail is a self-guided interpretative trail that highlights the unique natural characteristics of southeastern Idaho. The 18 interpretative signs discuss topics ranging from the geologic features that can be seen from the trail, such as volcanoes, to the vegetation found in the surrounding wet and dry environments.

The trail services a wide variety of users, with wheelchair accessibility for the first 0.5 mi and steeper slope closer to the top of the mountain loop. Additionally, tables and benches are located along the trail for visitors to sit and enjoy the scenery, read the interpretative signs, and picnic.

The educational interpretative signs accompanied by the opportunity to experience the beauty of southeastern Idaho attract a broad audience including local visitors, university geology students, and hundreds of area grade school children.

2.28. Transportation Facilities

2.28.1. Current Level

The Upper Snake FOA has a variety of authorized transportation facilities, the vast majority of which are the roads and trails found throughout the PA. These roads and trails serve a wide variety of transportation needs providing access to ranchers, forest and mining industry interests, recreationists, FO specialists, and administrators. The Upper Snake FO transportation system, as identified currently in BLM's FAMS, consists of approximately 880 road segments over approximately 3,500 mi of roads. The FOA also has about 24 mi of trails for motorized and non-motorized uses. Roads and trails listed in FAMS and in BLM administrative records may not (and probably do not) represent the sum total in the Upper Snake FOA. Experience in other BLM FOAs has taught the agency that there are likely many more miles of primitive roads on public lands that are user-created rather than agency-engineered.

BLM has existing categorical exclusion (CX) authority for installation and maintenance of routine signs for directional, informational, or regulatory purposes provided such signs are located adjacent to roads and trails identified in any land use or transportation plan. Likewise, BLM also has CX authority for placement of recreational, special designation, or information signs; visitor registers; kiosks; and portable sanitation devices (BLM 2008j).

2.28.2. Forecast

At the present time, there have been no additional requests for significant transportation facilities from within BLM, from the State of Idaho, or from other entities beyond those in existence today. The Upper Snake FO forecasts a need to maintain the present facilities, and will work within the framework of the agreements with outside entities for their facilities, and within established BLM guidelines for internal needs. Any future changes to the roads and trails system will follow criteria and guidelines that would be established through travel management planning.

2.28.3. Key Features

Descriptions of the roads and trails system, the issue of designating roads and trails, and further recommendations for management and maintenance are discussed in detail in the **Section 2.24**, CTTM.

The Upper Snake FOA includes two designated backcountry airstrips that are maintained by the Idaho Division of Aeronautic Services under existing ROWs. Public Law 106–291, § 345 (2000), states that the DOI cannot

> *"…permanently close aircraft landing strips, officially recognized by state or federal aviation officials, without public notice, consultation with cognizant State and Federal aviation officials and the consent of the Federal Aviation Administration."*

Additional guidance on maintenance of ROWs is covered in **Section 2.25**, Lands and Realty.

This page left intentially blank.

2.29. Social and Economic Features

As previously presented, the Upper Snake PA extends into 12 Idaho counties and 1 county in Wyoming. The social and economic discussion generally presents data at the county level; however, national and state-level data are also shown for context and comparison.

2.29.1. Population and Demographics

In 2006, the population in the 13-county region was 279,195 people. This is a 91% increase from the 1970 population. While this is slightly below Idaho's statewide growth rate (104%), it is nearly double the rate of national growth over the same period (46.6%). **Table 2-53** presents the PA's population and population change from 1970 to 2006.

The table illustrates the diversity among the counties in the PA. Population ranges from 93,533 in Bonneville County to 907 in Clark County. Growth rates have also varied tremendously over the period. Blaine, Teton (Idaho), Madison, and Teton (Wyoming) counties all experienced growth rates that more than doubled their population. The population of Teton County (Wyoming) grew by a magnitude of four. Other counties, however, saw much more modest growth rates. Butte County was the only county to lose population over the reported period. The table data reflect the difficulty of generalizing social and economic conditions in the PA. For this reason, where practical, data will be presented in its disaggregated (i.e., unweighted average) form.

Table 2-53. National, state, and PA population and change.

Location	1970	2006	Change (%)
United States	203,798,720	298,754,816	46.6
Idaho	717,225	1,463,878	104.1
Upper Snake PA			
Bingham County	29,251	43,089	47.3
Blaine County	5,815	21,411	268.2
Bonneville County	52,569	93,533	77.9
Butte County	2,918	2,744	-6.0
Clark County	753	907	20.5
Custer County	2,992	4,108	37.3
Fremont County	8,762	12,405	41.6
Jefferson County	11,763	21,911	86.3
Lemhi County	5608	7,745	38.1
Madison County	13,591	36,202	166.4
Power County	4,848	7,673	58.3
Teton County	2,359	7,810	231.1
Teton County, WY	4,879	19,657	302.9
13 County Aggregate	146,106	279,195	91.1

Source: U.S. Bureau of Economic Analysis 2006

Median age can reveal information relevant to land management decisions. Areas with a large proportion of retirees may have very different needs and preferences than communities populated primarily with working age families. On average, the population in the PA is younger than both Idaho's and the United States' population. However, the median age varies by 22 years among the PA counties. Lemhi County's median age is 42.7 years, suggesting a large retiree population in the county.[9] In contrast, Madison County's population is very young, with a median age of 20.7 years, indicating that the area is more densely populated with families with young children. Additionally, BYU–Idaho is located in Madison County (Rexburg), where many students take up year-round residence, lowering the median age substantially. **Table 2-54** presents median age by county for the PA.

Table 2-54. National, state, and PA population by median age in 2000.

Location		Median Age	
United States		35.3	
Idaho		33.2	
Upper Snake PA			
Location	**Median Age**	**Location**	**Median Age**
Bingham	29.7	Jefferson	28.8
Blaine	37.4	Lemhi	42.7
Bonneville	31.8	Madison	20.7
Butte	38.8	Power	31.6
Clark	30.7	Teton	31.3
Custer	41.2	Teton, WY	35
Fremont	31.9	13 County Aggregate	30.8

Source: U.S. Census Bureau 2000

2.29.2. Educational Attainment

Educational attainment, the measure of people with at least a high school diploma or bachelor degree, is an important indicator of an area's social and economic opportunities and its resiliency to change. As with population, educational attainment in the PA varies by county. **Table 2-55** lists the percent of the adult population with a high school diploma and a bachelor degree.

Educational attainment closely mirrors the population trends previously presented. While the percent of the adult population with at least a high school diploma is relatively consistent and high across the PA (with the notable exceptions of Power and Clark counties), the population with at least a bachelor degree varies much more dramatically. The five counties that meet or exceed both the state and national average for population with a bachelor degree are also the counties that experienced triple digit growth rates or have the largest population (in the case of Bonneville County). Similar trends are likely to continue, as areas with the most educated population also offer the most economic opportunities. Growth in these

[9] Data presented in the Employment and Income section corroborate this assumption: the non-labor income in Lemhi County exceeds 50%.

counties is likely to continue; however, counties with weaker growth and fewer college educated adults are less likely to present economic opportunities that positively influence population growth. Land management actions that affect the local economy are more likely to be significant in areas with lower educational attainment, as this often indicates fewer economic opportunities.

Table 2-55. National, state, and PA educational attainment.

Persons Age 25 or Older		
Location	**High School Graduate or Higher (%)**	**Bachelor Degree or Higher (%)**
United States	80.4	24.4
Idaho	84.7	21.7
Upper Snake PA		
Bingham	80.6	14.4
Blaine	90.2	43.1
Bonneville	87.8	26.1
Butte	82.6	13.0
Clark	64.0	12.6
Custer	84.5	17.4
Fremont	80.4	12.0
Jefferson	84.4	15.2
Lemhi	82.5	17.9
Madison	88.5	24.4
Power	74.7	14.3
Teton	87.3	28.1
Teton, WY	94.7	45.8

Source: U.S. Census Bureau 2000

2.29.3. Employment and Income

Per capita income and earnings per job are sometimes related; however, as **Table 2-56 and Table 2-57** demonstrate, they can also paint very different pictures about the state of the economy.

While per capita income has seen largely positive growth rates across the PA, earnings per job, presented in **Table 2-57**, look bleaker. Nine of the thirteen counties experienced a decrease in earnings per job, with the average earnings for a job in Clark County decreasing by more than half. Only Butte and Blaine counties saw growth that rivaled the national average.

Table 2-56. National, state, and PA per capita income and percent change.

Per Capita Income (Inflation Adjusted)			
Location	**1970 ($)**	**2006 ($)**	**Change (%)**
United States	21,225	36,714	73.0
Idaho	18,289	29,920	63.6
Upper Snake PA			
Bingham	16,949	23,105	36.3
Blaine	22,353	59,939	168.1
Bonneville	19,152	32,348	68.9
Butte	18,362	24,472	33.3
Clark	32,396	24,649	-23.9
Custer	15,795	26,381	67.0
Fremont	15,702	21,959	39.8
Jefferson	15,416	22,063	43.1
Lemhi	15,577	24,636	58.2
Madison	15,166	15,166	0.0
Power	21,535	21,535	0.0
Teton	15,697	25,697	63.7
Teton, WY	32,214	103,852	222.4
13 County Aggregate	18,095	33,688	86.2

Source: U.S. Bureau of Economic Analysis 2006.

Table 2-57. National, state, and PA earnings per job and percent change.

Earnings Per Job (Inflation Adjusted)			
Location	**1970 ($)**	**2006 ($)**	**Change (%)**
United States	39,224	47,286	20.6
Idaho	33,539	35,431	5.6
Upper Snake PA			
Bingham	31,934	29,147	-8.7
Blaine	29,429	36,576	24.3
Bonneville	35,857	35,613	-0.7
Butte	48,935	70,404	43.9
Clark	48,571	21,262	-56.2
Custer	27,045	28,066	3.8
Fremont	29,918	23,367	-21.9
Jefferson	28,920	22,482	-22.3
Lemhi	27,081	21,128	-22.0

Earnings Per Job (Inflation Adjusted)			
Location	**1970 ($)**	**2006 ($)**	**Change (%)**
Madison	28,110	26,514	-5.7
Power	37,894	30,366	-19.9
Teton	26,754	24,536	-8.3
Teton, WY	33,825	39,153	15.8
13 County Aggregate	33,806	33,683	-0.4

Source: U.S. Bureau of Economic Analysis 2006

The substantial difference between per capita income and earnings per job can largely be explained by the role of non-labor income. Non-labor income, which includes rent, transfer payments, and dividend payments, is included in measures of per capita income, but not in earnings per job. An influx in retirees can increase per capita income even while earnings per job decrease. **Table 2-58** presents the change in share of labor versus non-labor income from 1970 to 2006.

Table 2-58. National, state, and PA labor and nonlabor income comparisons for 1970 and 2006.

Location	Labor % (1970)	Non-Labor % (1970)	Labor % (2006)	Non-Labor % (2006)
United States	77	23	68	32
Idaho	78	22	67	33
Upper Snake PA				
Bingham	82	18	68	32
Blaine	73	27	53	47
Bonneville	82	18	67	33
Butte	81	19	60	40
Clark	87	13	67	33
Custer	75	25	51	49
Fremont	78	22	60	40
Jefferson	81	19	70	30
Lemhi	70	30	48	52
Madison	80	20	69	31
Power	83	17	63	37
Teton	76	24	67	33
Teton, WY	69	31	39	61
13 County Aggregate	80	20	59	41

Every county experienced an increase in non-labor income relative to labor income between 1970 and 2006. In 1970, the ratio of labor to non-labor income in the PA was similar to the state and national rates. By 2006, the PA aggregate had diverged, with a nearly 10% greater share of non-labor income relative to Idaho and the United States. Non-labor income can provide economic stability in an area, as it is not directly tied to employment. Therefore, an area with a high proportion of non-labor income may be less susceptible to economic downturns. However, it is important to note that an increase in non-labor income will not guarantee an increase in per capita income. Clark County experienced one of the largest increases in the share of non-labor, while also facing the only decrease in per capita income in the PA.

Figure 3 (U.S. Bureau of Economic Analysis 2009) compares the PA's share of income to its share of population (Teton County, Wyoming is excluded, as it is not included in Idaho state totals). Only Blaine and Bonneville counties have a greater share of income relative to population. Blaine County's share of personal income is more than double its share of population. Blaine County has the highest per capita income as well as the highest educational attainment of the 12 Idaho counties. These conditions suggest that BLM management actions affecting Blaine County, while not necessarily trivial, are unlikely to have a significant effect on the local economy.

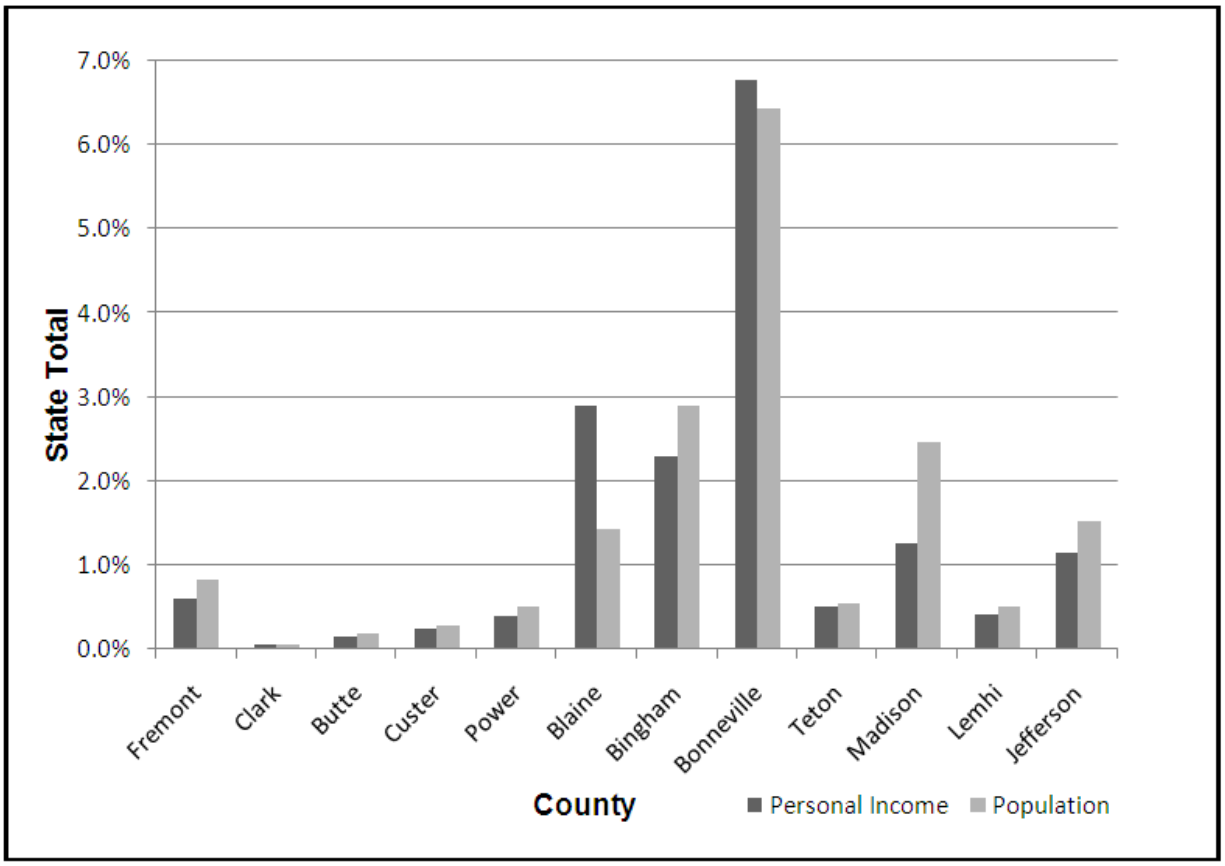

Figure 3. Share of income and share of population in the Idaho counties of the Upper Snake PA.

The diversity of an economy is another essential measure of economic resiliency and opportunity. Generally, a diverse economy is more resistant to downturns and more attractive to educated adults. Highly specialized economies (often, not always) are more prone to cyclical fluctuations and offer limited employment opportunities. **Table 2-59** illustrates the share of employment sectors in the PA relative to the United States. On average, the PA is much more agricultural and has a greater share of professional services. At the other end, the PA has less employment in manufacturing and health care than the U.S. average. Overall, **Table 2-59** indicates that the PA is quite diverse, with all but two sectors within three percentage points of the U.S. share.

Unemployment is another measure of economic opportunity. On average, the unemployment rate in the PA is below the national average. **Table 2-60** lists the unemployment figures from March 2009. These updated figures enable an analysis of how the counties have fared during the national downturn.

The unemployment figures indicate that the PA has generally responded better to the recession than the nation as a whole. Most of the counties also have lower unemployment rates than the state. Lemhi County has the highest unemployment rate in the PA; it is also the only county in the area with a higher rate than the nation. On average, Lemhi County residents are older, less educated, and work in lower paying jobs than in other counties in the area. These factors contribute to less economic resiliency during economic downturns.

Table 2-59. The Upper Snake FO's shares of 20 industry/employment sectors relative to the United States.

Industry Sector Analysis				
Industry (Employment) Sector	**Planning Area Share (%)**	**U.S. Share (%)**	**Difference (%)**	**Conclusion**
Agriculture, forestry, fishing, hunting	7	1	6	Industry sectors where the PA has a greater share of employment relative to the U.S.
Professional, scientific, technical	9	6	3	
Construction	9	7	2	
Accommodation and food services	8	6	2	
Educational services	10	9	1	
Retail trade	12	12	0	Industry sectors where the PA and the U.S. shares of employment are equal.
Real estate and rental leasing	2	2	0	
Wholesale trade	4	4	0	
Utilities	1	1	0	
Mining	0	0	0	
Management of companies and enterprises	0	0	0	
Arts, entertainment, and recreation	2	2	0	
Public administration	5	5	0	
Administration, support, and waste services	3	3	0	

Industry Sector Analysis				
Industry (Employment) Sector	**Planning Area Share (%)**	**U.S. Share (%)**	**Difference (%)**	**Conclusion**
Other services (except public administration)	4	5	-1	Industry sectors where the PA has a smaller share of employment relative to the U.S.
Information	2	3	-1	
Transportation and warehousing	3	4	-1	
Finance and insurance	3	5	-2	
Health care and social assistance	9	11	-2	
Manufacturing	9	14	-5	

Source: U.S. Census Bureau 2000

Table 2-60. National, state, and PA unemployment rates as of March 2009.

Location	Unemployment Rate (%)		
United States	9.0		
Idaho	7.9		
Upper Snake PA			
Location	**Unemployment Rate (%)**	**Location**	**Unemployment Rate (%)**
Bingham	6.2	Jefferson	6.7
Blaine	7.2	Lemhi	10.8
Bonneville	5.8	Madison	4.5
Butte	6.1	Power	6.5
Clark	6.0	Teton	5.2
Custer	7.2	Teton, WY	5.1
Fremont	8.9	13 County Aggregate	6.6

Source: U.S. Bureau of Labor Statistics 2009

2.29.4. Housing

Housing costs are generally the largest contributor to cost of living. Housing affordability, therefore, is an important measure of a population's purchasing power. **Table 2-61** presents housing affordability in the PA. A score of 100 or above indicates that the median household can afford a median-priced home in the county.

Overall, housing is very affordable in the PA, and has become more affordable since 1990. However, Blaine and Teton (Wyoming) counties do not offer affordable housing to the median household. Additionally, both became less affordable over the reporting period. Blaine and Teton (Wyoming) counties, however, fared the best along other economic measures. These counties have the highest per

capita income, at least double the rate of educational attainment (bachelor degree) than most other counties in the PA, and the lowest unemployment rates.

Vacancy rates provide another measure of housing and the local economy. A high vacancy rate generally suggests low population and job growth, with a low median house price. In contrast, a low vacancy rate, often due to rapid population growth, drives prices upward. **Table 2-62** presents housing availability and vacancy rate. Homes owned for seasonal use are included in the vacancy rate, which can cause an area with large second home ownership (i.e., vacation or partial year retiree homes) to appear to have a much higher vacancy rate. For instance, both Blaine and Teton (Wyoming) counties appear to have very high vacancy rates before seasonal use is excluded. This would conflict with **Table 2-61** which notes that these two counties have the least affordable housing in the PA. **Table 2-62**, therefore, removes seasonal use from the number of vacant units to give a more accurate measure of housing availability. With this adjustment, Blaine and Teton (Wyoming) counties have some of the lowest vacancy rates, which are below both the state and national average.

Table 2-61. National, state, and PA housing affordability.

Location	1990	2000
United States	133	148
Idaho	151	145

Upper Snake PA					
Location	**1990**	**2000**	**Location**	**1990**	**2000**
Bingham	160	169	Jefferson	149	160
Blaine	94	74	Lemhi	153	136
Bonneville	161	182	Madison	115	135
Butte	220	190	Power	166	146
Clark	221	173	Teton	129	122
Custer	176	155	Teton, WY	81	62
Fremont	165	158	13 County Aggregate	147	160

Source: U.S. Census Bureau 1990, 2000

Overall, the 13 county aggregation has a vacancy rate roughly similar to the state and national average, but as with other measures, there is little consistency among the counties. Custer County has the highest vacancy rate, which is three times the lowest rate (in Teton County, Wyoming). Clark, Butte, Custer, and Lemhi counties all have double digit vacancy rates. This finding is unsurprising, as these counties also have some of the most affordable housing in the PA. These are also the same counties that experienced the lowest population growth rates in the area, as reported in **Table 2-53**.

Table 2-62. National, state, and PA housing availability and vacancy rates.

Location	Total	Occupied	Vacant	Seasonal Use	Vacant (Seasonal Excluded)	Vacancy Rate (%) (Seasonal Excluded)
United States	115,904,641	105,480,101	10,424,540	3,578,718	6,845,822	5.91
Idaho	527,824	469,645	58,179	27,478	30,701	5.82
Upper Snake PA						
Bingham	14,303	13,317	986	103	883	6.17
Blaine	12,186	7,780	4,406	3,723	683	5.60
Bonneville	30,484	28,753	1,731	377	1,354	4.44
Butte	1,290	1,089	201	38	163	12.64
Clark	521	340	181	125	56	10.75
Custer	2,983	1,770	1,213	747	466	15.62
Fremont	6,890	3,885	3,005	2,336	669	9.71
Jefferson	6,287	5,901	386	53	333	5.30
Lemhi	4,154	3,275	879	459	420	10.11
Madison	7,630	7,129	501	70	431	5.65
Power	2,844	2,560	284	29	255	8.97
Teton	2,632	2,078	554	355	199	7.56
Teton, WY	10,267	7,688	2,579	2,121	458	4.46
13 County Aggregate	102,471	85,565	16,906	10,536	6,370	6.22

2.29.5. Environmental Justice

EO 12898 requires federal agencies to address,

> *"…disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations…."* (59 FR 32, 1994)

The Council on Environmental Quality developed environmental justice guidance in 1997 that highlights federal agencies' responsibilities. The EO establishes the following criteria to determine low income and minority populations:

- Low income populations are areas that exceed the annual statistical poverty thresholds, as established by the Bureau of the Census.
- Minority populations must be considered in areas where the population of established minority groups (American Indian or Alaska Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic) is (a) at least 50% of the affected area's population, or (b) the minority population in the

affected area is "meaningfully greater" than the minority population in the wider area (59 FR 32, 1994, §1-101).

The poverty rate varies widely across counties in the PA. Most of the counties have a poverty rate similar to both the state and national average. **Table 2-63** displays the poverty rates for each county in the PA. Again, these rates differ substantially, with a factor of four separating the lowest rate from the highest.

Madison County has the highest poverty rate, at 21.5%, which is about 9 points higher than the comparison statistics. Madison County also has the lowest per capita income of any county in the PA; however, it paradoxically had the lowest unemployment rate in the March 2009 data (U.S. Bureau of Labor Statistics 2009). This seeming paradox is explained by the large proportion of university students who live year-round in the county. Full-time students generally earn little, if any income, but are not classified as unemployed. Therefore, changes in the local economy are unlikely to have a significant or disproportionate affect on this population. Although Clark, Butte, and Power counties have poverty rates that exceed the state and national average, they are within a short range of these averages.

Table 2-63. National, state, and PA poverty rates, 2007.

Persons Below Poverty (%)			
Location		**2007**	
United States		13.0	
Idaho		12.1	
Upper Snake PA			
Location	**2007**	**Location**	**2007**
Bingham	12.8	Jefferson	12.0
Blaine	6.5	Lemhi	13.5
Bonneville	10.8	Madison	21.5
Butte	16.0	Power	16.1
Clark	15.0	Teton	8.7
Custer	12.4	Teton, WY	4.9
Fremont	13.2	–	–

Source: U.S. Census Bureau 2007

In general, the population in the PA is more ethnically homogeneous than both the state and nation; however, there are several notable exceptions. Eight of the counties exceed the state's Hispanic population. Three of the counties have a larger percentage of Hispanic individuals than the national average. Power and Bingham counties have larger concentrations of Native American/Alaska Native individuals. Among the other ethnic groups, however, the population in the PA is either far below the state and/or national averages (such as the Black, African American and Asian populations) or is similar (U.S. Census Bureau 2007). **Figure 4** depicts ethnic breakdown by county for the PA.

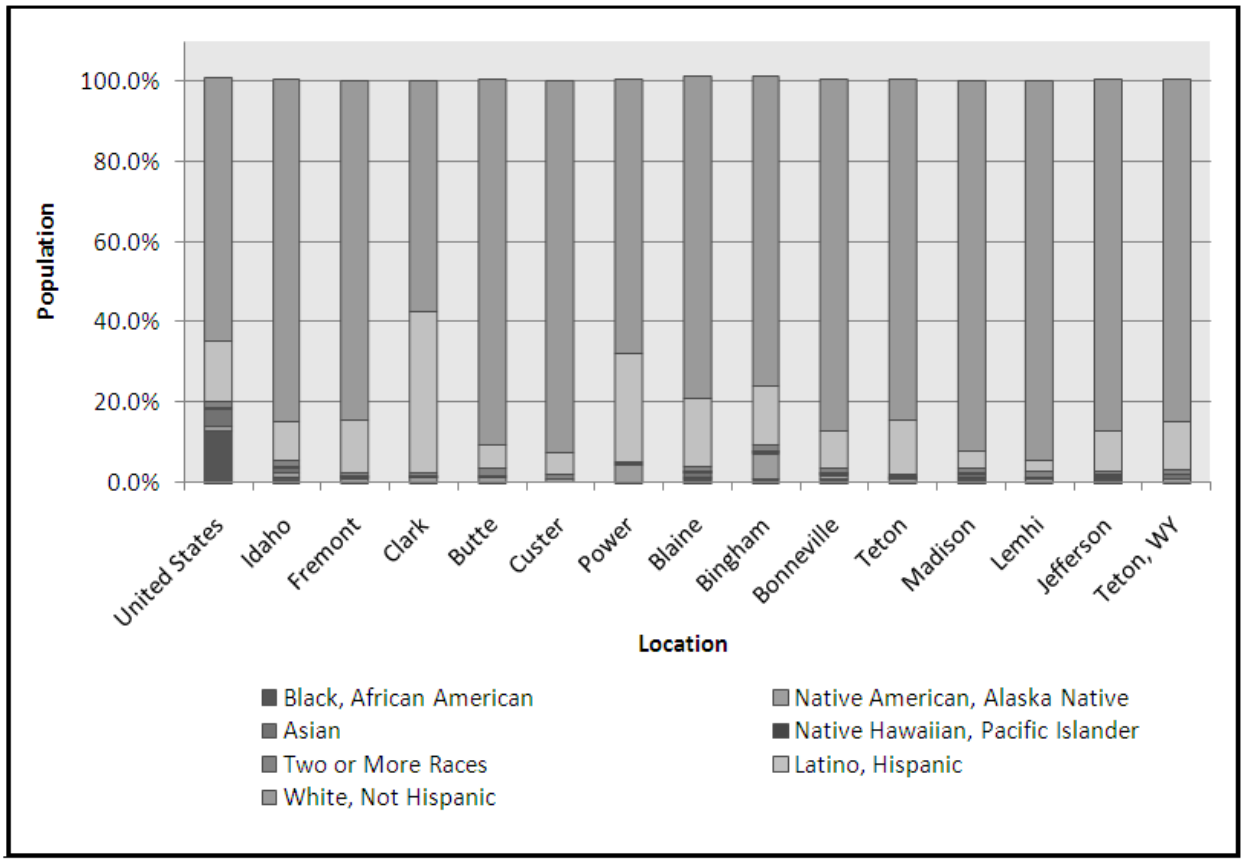

Figure 4. Population by race/ethnicity (U.S. Census Bureau 2007).

None of the counties have minority populations that exceed 50% of total population. However, at least three counties in the PA have a minority population that is arguably "meaningfully greater," than the minority population in the wider area. Power and Clark counties have Hispanic populations that far exceed both the state and national average. Additionally, the Native American/Alaska Native population in Power and Bingham counties, while small in absolute terms, is large in percentage terms relative to the rest of the PA, the state, and the nation.

Tribes

The Upper Snake PA includes part of the Fort Hall Reservation in Power and Bingham counties. The reservation was created in 1867 following the establishment of peace treaties with the U.S. government (USA and Shoshone–Bannock Tribes 1869). The Shoshone and Bannock Tribes have a long history in the region, with multiple traditional ties to the land in the PA, including hunting, gathering, cultural, and spiritual uses.

The unemployment rate on the reservation fluctuates between 20–40%, which is many times larger than the average rate in the PA (Shoshone–Bannock Tribes 2009b). Additionally, 27.2% of the individuals on the reservation fall below the poverty line (U.S. Census Bureau 2000).

Resource Uses and Values

Public lands provide economic benefits to the region and its residents. Recreation, fishing, and grazing on public lands are some of the most common uses that offer economic benefits to both the user and the surrounding area. Public land resources have both market and non-market values. Non-market values include use and non-use values. Use values include activities such as recreation and hunting. Non-use values are based on the value of knowing that a resource exists, even if there is no intention of future use.

Payments to Counties

The Federal Government manages more than 57% of the land in the PA. BLM administers 25% of the total land in the PA, which makes the BLM second only to private land owners (36% of the lands are privately held). Public lands are not subject to property taxes. Payments-in-lieu-of-taxes (PILT) have been paid to counties with public lands since 1976 to offset the decreased local tax base. PILT is meant to compensate counties that provide services used by federal agencies and public land users (such as road maintenance and law enforcement). **Table 2-64** presents PILT received by county throughout the PA. For counties that are located in multiple BLM FOAs (such as Custer and Teton County, Wyoming), only the land managed by the Upper Snake FO is considered). Nearly $2M in PILT has been paid to local governments within the Upper Snake PA. A change in public lands status would change PILT amounts. However, any public lands that changed to private ownership would be subject to regular property taxes.

Table 2-64. National, state, and PA PILT payments for Fiscal Year 2008.

Location	Total Payment ($)	BLM Managed (%)	BLM's Contribution ($)
United States	367,199,955	40.6	149,145,420
Idaho	25,831,812	35.6	9,198,180
Upper Snake PA			
Bingham	646,005	77.0	497,145
Blaine	1,733,711	7.0	120,949
Bonneville	1,241,355	15.5	192,437
Butte	401,445	55.8	224,169
Clark	141,230	48.1	67,869
Custer	641,630	3.0	19,170
Fremont	1,076,863	20.9	225,564
Jefferson	434,728	100.0	434,728
Lemhi	847,898	0.2	1,430
Madison	132,954	27.1	35,971
Power	672,253	23.9	160,424
Teton	196,585	7.8	15,251
Teton, WY	1,367,902	0.1	781
13 County Aggregate	9,534,559	–	1,995,887

Source: U.S. Department of the Interior 2008k

2.29.6. Public Safety

Abandoned Mine Lands

Upper Snake FO staff have performed remediation on five abandoned mine sites to date. The BLM abandoned mine lands (AML) program seeks to improve water quality and reduce environmental and physical hazards in areas associated with historic mining. **Table 2-65** presents the location, type of site, and type of remediation work performed on these sites. Monitoring work continues at North Creek and Champagne Creek/Moran Tunnel to ensure remediation goals are still being met and to investigate any new condition that may affect these sites. The Upper Snake FO estimates that there are at least two additional AML areas that still need to be inventoried and, where needed, remediated. These areas are North Lava Creek east of Craters of the Moon National Monument and Preserve and Badger Creek north of Howe, Idaho, in the Little Lost Valley. BLM continues to inventory public lands for AML sites and their hazards and remediate them while protecting associated natural and cultural resources.

Hazardous Materials

Upper Snake FO staff have discovered the following hazardous materials and wastes indiscriminately dumped on public lands since the 1980s: pesticides (including herbicides, insecticides, and fungicides) and their containers, asbestos, petroleum wastes (oil, grease, solvents, tars), paints and thinners, batteries, tires, and septic waste. BLM has removed about 21 dump sites contaminated with hazardous materials/wastes. **Table 2-66** presents the sites, their size, and contaminant(s) found. Often seen at these dump sites is that solid waste has been dumped as well; thus, any associated solid wastes that were encountered and removed are also shown in **Table 2-66**. BLM actively inventories, investigates for responsible parties (find the dumpers), and removes sites contaminated with hazardous materials/wastes. All materials/wastes are removed to an approved disposal facility. In the State of Idaho, BLM manages these clean-ups through a MOU with IDEQ, which assures that proper investigation and removal of hazardous materials/wastes occur on public lands and that all federal, state, and local laws and regulations are followed (BLM and IDEQ 2006). Also, throughout the 1990s, BLM used the public media to educate the public about "not dumping on public land," and as a result most (but not all) of the hazardous material/waste dumping has stopped.

Table 2-65. AML remediation projects to date in the Upper Snake FOA.

AML Site	Location (Idaho)	Remediation Activities	Completed (Year)
Champagne Creek/ Moran Tunnel	15 mi west of Arco	Soil pile removed and placed in capped repository; passive treatment system constructed for 3–6 gpm flow from tunnel and entire area fenced. Bioremediation amendments added to berm and pond; downstream wetland enhanced; constructed bat- friendly, no-human entry gate at adit.	1999 2000; 2005
Long Canyon	21 mi northwest of Mud Lake	Constructed one bat gate on larger, horizontal adit; backfilled smaller adit	2005
North Creek	13 mi north of Howe	Mill tailings moved from channel to capped repository. Mill demolished and placed in repository; additional tailings moved to repository; large rock check	1982–1983

AML Site	Location (Idaho)	Remediation Activities	Completed (Year)
		structures, settling basin, and channel reconstruction performed to confine large periodic flood events.	1999
Scott Butte	16 mi northwest of Mud Lake	Polyurethane foam filled one vertical mine shaft; five vertical mine shafts re-fenced; backfilled two vertical shafts.	2004
South Lava Creek	16 mi southwest of Arco	Large, vertical mine shaft fenced; smaller vertical shafts and adits backfilled; mass wasting hillslope reshaped and reseeded.	2002

Table 2-66. Hazardous material/waste removal actions to date in the Upper Snake FOA.

Site Name	Location (Idaho)	Material/Waste	Year Removed	Size of Hazardous Material/Waste Dump
Antelope Creek	10 mi southwest of Darlington	Pesticide containers	1992	Two containers removed
Arco Area	5–6 mi north of Arco	Asbestos tile	1998	About five bags removed
Cinder Road	7–8 mi northwest of Roberts	Pesticide-contaminated soil and containers	1994	Removed 10 containers and 80 yd^3 of soil
Crystal Ice Caves	16 mi northwest of American Falls	Diesel fuel tank	1998	One 1,000 gal tank and contents removed
Egin-Hamer Road	9 mi east of Hamer	Pesticide-contaminated soil	1997	100 yd^3 soil removed
Hamer North	15 mi north of Hamer	Solvents, paints, friable asbestos	1992	About 5 acres of dump removed by responsible party
Highway 33-Plano	10 mi west of Rexburg	Pesticide-contaminated soil and containers	1991	Removed 80 containers and 27 yd^3 of soil
Hoff Road	18 mi west of Blackfoot	Asbestos; pesticide containers and contaminated soil	1991–1992; 1996	About 850 pesticide containers and 20 yd^3 soil removed. About 102 bags asbestos removed.
Hoff Road South—Burned Site	22 mi west of Blackfoot	Solvents and petroleum wastes	1996	Four drums removed
Lewisville Knolls	2 mi southwest of Lewisville	Batteries, tires, solvent drums	2003	Two drums of solvents and petroleum wastes removed

Site Name	Location (Idaho)	Material/Waste	Year Removed	Size of Hazardous Material/Waste Dump
Liberty	14 mi west of Blackfoot	Asbestos; pesticide wastes; pesticide-contaminated soil and containers	1993; 2006	About 1,000 pesticide containers, 15 yd^3 soil, and 30 bags of asbestos were removed
Main Snake River (Firth) Flood Petroleum Tanks	1 mi west of Firth	Two diesel fuel tanks	1997; 2002	Two tanks (one 800 and one 10,000 gal) were removed
Menan Buttes	7 mi north of Menan	Batteries, tires, asbestos pipe	2000–2006	2 tons pipe and numerous batteries removed
Monteview	6 mi northeast of Monteview	Pesticide-contaminated soil and containers	1992	11 pesticide containers and 26 yd^3 of soil removed
Monument Butte	18 mi northwest of Ashton	Pesticide containers	1991	About 70 containers removed
Morgan's Pasture	13 mi north of Blackfoot	Asbestos pipe, pesticide wastes, containers and contaminated soil, solvents and petroleum wastes	1989–2006	1,200 pesticide containers, one pipe, two drums solvents and petroleum wastes removed
Mud Lake Airport	2 mi northwest of Mud Lake	Pesticide containers and contaminated soil	1992	Removed 10 containers and 21 yd^3 of soil
Parker	4 mi north of Parker	Pesticide containers and wastes	1991	About 70 containers removed
Pass Creek Road/Leslie Dump	2.5 mi north of Leslie	Batteries, tires	2006	About 3 acres of dump removed
Powerline Road/Morgan's Pasture East	8 mi west of Shelley	Batteries, pesticide containers	1994	49 batteries and about 12 containers removed
Sage Junction	11 mi east of Mud Lake	Asbestos tile	1998	About 10 bags of asbestos removed

Solid Waste Dump Sites

Throughout southeast Idaho, many public lands within the PA border on extensive acreages of private lands being farmed for alfalfa hay, potatoes, corn, or sugar beets. Many of these public lands have basaltic lava on the surface and have been viewed in the past as "wastelands." Much of this dumping has occurred since the 1940s and 1950s. These lands have received a lot of hazardous and solid wastes over the years, from farmers and non-farmers.

In the early to mid-1990s, EPA implemented the Resource Conservation and Recovery Act of 1976 (RCRA, 42 U.S.C. 82 § 6901 et seq.) Subtitle D landfill regulations and required new standards resulted in the closure of many existing landfills. During this same time period, an increase in solid waste dumping was observed on public lands. BLM began receiving funding for solid waste removals in the early 2000s and, again, held media events to get the "no dumping" message to the public. Although some dumping continues today on public lands, it's much reduced from what occurred in the past.

Upper Snake FO staff actively investigates any new, active dumping areas, and involves law enforcement. The FO also monitors all of the major removal action locations to date, as well as monitoring the sites for future compliance. **Table 2-67** presents the Upper Snake FO's major solid waste removal projects.

Table 2-67. Solid waste removal actions to date in the Upper Snake FOA.

Site Name	Location (ID)	Materials Removed	Year Completed
Antelope Creek	10 mi southwest of Darlington	Lumber, wire, metal, construction debris, household waste, farm equipment, appliances, livestock carcasses	1992 (fenced)
Arco Area	4.5 mi east of Arco	Lumber, wire, metal, construction debris	2005
Butte Canal Well Drums	4.5 mi north of Menan	Four 55-gal drums removed	1996
Clowards Crossing	11 mi southeast of Idaho Falls	Lumber, wire, metal, construction debris, and farm equipment	2000
Deer Parks	3.5 mi northwest of Menan	Lumber, wire, metal, construction debris and farm equipment	2006
Hamer North	15 mi north of Hamer	Potatoes, lumber, wire, metal, construction debris	1992
Hoff Road South	22 mi west of Blackfoot	123 empty pesticide containers	1996
Hoff Road South–Burned Site	22 mi west of Blackfoot	20 yd^3 of debris	1995
Idaho Falls–West	7 mi west of Idaho Falls	Lumber, wire, metal, construction debris	2006
Lemhi Ridge	8 mi northwest of Blackfoot	150 yd^3 of debris	2005
Lewisville Knolls	2 mi southwest of Lewisville	Lumber, wire, metal, construction debris, household waste, farm equipment and car bodies	1992, 2005
Liberty	14 mi west of Blackfoot	Lumber, wire, metal, construction debris, household waste, farm equipment, appliances, livestock carcasses	2005
McDonaldville Landfill Site (closed)	6 mi north of Blackfoot	Six empty 55-gal drums	1997
Menan Buttes	7 mi north of Menan	Lumber, wire, metal, construction debris, household waste, farm equipment, car bodies and livestock carcasses	2000–2006

Site Name	Location (ID)	Materials Removed	Year Completed
Morgan's Pasture	13 mi north of Blackfoot	Lumber, wire, metal, construction debris, household waste, farm equipment, car bodies, livestock carcasses, and appliances	2006
Pass Creek Road/Leslie	2.5 mi north of Leslie	Lumber, wire, metal, construction debris, household waste, farm equipment, car bodies, livestock carcasses, and appliances	2006
Roberts Southwest	4.5 mi southwest of Roberts	Lumber, wire, metal, construction debris, farm equipment, appliances and furniture	2007
Sage Junction Area	9 mi north of Roberts	Lumber, wire, metal, construction debris, household waste, farm equipment, car bodies, and appliances	2007
Upper Sawmill Creek	30 mi north of Howe	Lumber, wire, metal, farm equipment	2007