CHAPTER THREE - AFFECTED ENVIRONMENT

This chapter describes existing conditions, trends, opportunities, and risks of resources that could be affected as a result of implementing any of the alternatives or this Environmental Impact Statement (EIS). Specific aspects of each resource discussed in this section (e.g., surface water quality, sage grouse) were raised during the public and agency scoping process. The level of information presented in this chapter is commensurate with and sufficient to assess potential effects of the alternatives in Chapter 4, Environmental Consequences, of this EIS. Also presented are general trends that have been occurring to resources as a result of existing land use plans (LUPs) that the Idaho Bureau of Land Management (BLM) uses for land management in the planning area. Risks to individual resources as a result of fire suppression and wildland fire are discussed, along with opportunities to manage individual resources under fire, fuels, and related vegetation planning processes.

3.1 FIRE AND FUELS MANAGEMENT CONCERNS FOR THE PLANNING AREA FIELD OFFICES

The planning area's four BLM field offices - Upper Snake Field Office (USFO), Pocatello Field Office (PFO), Burley Field Office (BFO), and Shoshone Field Office (SFO) - comprise a wide variety of landscapes, topographies, cover types, and habitats. Forest/timber types are concentrated on the planning area's eastside, in the USFO and PFO; the PFO is also concerned with Wildland Urban Interface (WUI) issues. Sagebrush steppe cover types are present throughout the planning area, including the Snake River Plain, and the valleys and foothills south to the borders of Utah and Nevada (i.e., the BFO, SFO, and USFO). The land administered by the BFO has the planning area's largest area of juniper encroachment. The SFO has areas of sagebrush steppe with large populations of three-tip sagebrush, which is uncommon in other portions of the planning area. These differences among field offices and differences in their past-use histories all influence the present state of the vegetation, its conditions, its altered ecologies, its problems, and its priorities. Following is a brief synopsis of the issues each field office faces.

3.1.1 UPPER SNAKE FIELD OFFICE (USFO)

The primary focuses of current management for the USFO include the WUI, as well as maintaining or improving Low-elevation Shrub in the Big Desert area (west of Blackfoot) by means of fire rehabilitation and hazardous fuels reduction projects focused on restoration. The dominance of this area by highly flammable annual cheatgrass and perennial grasses is a consequence of large fires over the past 10 years that have decimated the shrub canopy. In Mid-elevation Shrub (e.g., north of Camas National Wildlife Refuge and the St. Anthony Dunes area), RxFire and mechanical treatments remain priorities to reduce hazardous fuels and restore ecological health. Remaining priorities involve projects in Mountain Shrub, Dry Conifer, and Aspen/Conifer types to stimulate desirable species and to reduce hazardous fuels.

3.1.2 POCATELLO FIELD OFFICE (PFO)

The primary focus of current management for the PFO is the WUI, which is predominately composed of Juniper with a variety of other cover types, depending upon location (e.g., Lava

Ranch, Portneuf, and Buckskin areas). Juniper encroachment into Mid-elevation Shrub is also an issue in the WUI of the PFO. Outside the WUI, priorities include aspen regeneration and Dry Conifer forest health issues. Mountain Shrub regeneration and the control and eradication of noxious and invasive weeds are emerging issues both within and outside the WUI.

3.1.3 BURLEY FIELD OFFICE (BFO)

The primary focuses of current management for the BFO inclue the WUI, as well as to restore areas of Low- and Mid-elevation Shrub that are presently dominated by cheatgrass and areas experiencing juniper encroachment. Another priority is to remove encroaching and mature Utah Juniper from Mountain Shrub cover types and pinyon sites (mapped within Juniper) and restore Aspen, Riparian, and Low-elevation and Mid-elevation Shrub types to more natural conditions. In late-seral stage sagebrush stands, other priorities include reducing shrub density and increasing the herbaceous understory, thereby reducing the uncharacteristic wildland fires in these cover types.

3.1.4 SHOSHONE FIELD OFFICE (SFO)

The primary focuses of management for the SFO include the WUI, as well as to reduce the risk and severity of wildland fires in the Low-elevation and Mid-elevation Shrub types, which have been impacted by wildland fire over the past 30 years. Frequent (<10-year fire return intervals), unplanned fires have converted shrub types to predominately Invasive Annual Grass types, which severely impact multiple resources and their uses.

The first priority for the SFO is to restore areas of Invasive Annual Grass and Low-elevation Shrub heavily invaded by non-native annuals, especially in areas adjacent to intact sagebrush steppe. Additional priorities are to restore, enhance, or maintain areas of Dry Conifer, Aspen, Mountain Shrub, and Mid-elevation Shrub via hazardous fuels reduction projects. In late-seral stage sagebrush stands, other priorities include reducing shrub density and increasing the herbaceous understory, thereby reducing the risk and severity of wildland fires in these cover types.

3.2 VEGETATION RESOURCES AND FIRE'S NATURAL ROLE (ISSUE 1)

One of the principal goals of the Cohesive Strategy (U.S. Forest Service [USFS] 2000) is to return fire to its historical range in all cover as described by Fire Regime Condition Class (FRCC) 1. FRCC is a measure of vegetation and fuel departure, as well as fire severity and frequency departure. Vegetation in a condition of FRCC 1 would correspond to its historical range of conditions and would be less susceptible to uncharacteristic fires; see Table 3-1 for definitions of FRCC 1-3. Descriptions of species that characterize cover types, area extents, and cheatgrass (*Bromus tectorum*) invasion of the planning area's vegetation cover types are presented in Table 3-2 and Table 3-3.

For the purpose of determining current FRCC and analyzing the effects of the alternatives, these vegetation cover types were grouped based on ecological site and similar historic fire regimes: Low-elevation Shrub (including Perennial and Invasive Annual Grass), Mid-elevation Shrub (including juniper encroachment); Mountain Shrub; Aspen/Conifer; Dry Conifer; Salt Desert Shrub; Vegetated rock/lava; Wet/Cold Conifer; and Riparian. Summaries of current vegetation condition and FRCC for each cover type are found under each cover type description in Sections 3.2.1.1 through 3.2.1.8.

TABLE 3-1. FIRE REGIME CONDITION CLASS[1] (FRCC) DESCRIPTIONS

FRCC	Departure from Natural (Historical) Fire Regime	Description
FRCC 1	Minimal or none (0% to 33% departure)	Vegetation composition, structure, and fuels are similar to those of the historical regime and do not pre-dispose the system to risk of loss of key ecosystem components. Wildland fires are characteristic of the historical fire regime behavior, severity, and patterns. Disturbance agents, native species habitats, and hydrologic functions are within the historical range of variability.
FRCC 2	Moderate (33% to 66% departure)	Vegetation composition, structure, and fuels have moderate departure from the historical regime and predispose the system to risk of loss of key ecosystem components. Wildland fires are moderately uncharacteristic compared to the historical fire regime behaviors, severity, and patterns. Disturbance agents, native species habitats, and hydrologic functions are outside the historical range of variability.
FRCC 3	High (>66% departure)	Vegetation composition, structure, and fuels have high departure from the historical regime and predispose the system to high risk of loss of key ecosystem components. Wildland fires are highly uncharacteristic compared to the historical fire regime behaviors, severity, and patterns. Disturbance agents, native species habitats, and hydrologic functions are substantially outside the historical range of variability.

[1] Hann 2001.

TABLE 3-2. CURRENT VEGETATION COVER TYPES OF THE PLANNING AREA

Vegetation Cover Type	Characterized By:
Low-elevation Shrub	Sagebrush steppe: Wyoming big sagebrush, basin big sagebrush, etc., with native grass and forb understory. Biological crust in interspaces.
Perennial Grass[1]	Sagebrush steppe: Seeded areas (native/non-native) and native grasslands (bluebunch wheatgrass (*Pseudoroegneria spicata*), needlegrass (*Achnatherum Beauv*.), Idaho fescue (*Festuca idahoensis*), etc.). Biological crust may be present in interspaces.
Invasive Annual Grass[1]	Potential sagebrush steppe: Principally, cheatgrass and medusahead wildrye (*Taeniatherum caput-medusae*). Biological crust may be present in interspaces.
Mid-elevation Shrub	Sagebrush steppe: Mountain big sagebrush, low sagebrush, bitterbrush, aspen, etc., with native grass and forb understory. Biological crust may be present in interspaces.
Juniper	Rocky Mountain juniper, Utah juniper, limber pine, and /or single leaf pine. Natural juniper (approximately 12% juniper area), pinyon-juniper (approximately 5% juniper area), and juniper encroachment in sagebrush steppe habitat (approximately 83% juniper area). Biological crust may be present in interspaces.
Dry Conifer	Douglas-fir, limber pine, ponderosa pine.
Aspen/Conifer	Includes healthy stands of aspen and invading conifer.
Mountain Shrub	Serviceberry, buckbrush *(Ceanothus)*, snowberry, mountain mahogany, bigtooth maple, chokecherry, antelope bitterbrush, aspen, etc., with native grass and forb understory.
Wet/Cold Conifer	Lodgepole, Subalpine fire, Engelmann spruce, etc.
Riparian areas	Streamside and wetland areas of cottonwood, willow, etc.
Salt Desert Shrub	*Atriplex* spp. (four-wing, shadscale), spiny hopsage, winterfat, greasewood, etc., with native grass and forb understory. Biological crust in interspaces.
Vegetated Rock/Lava	Lava, sand dunes, barren areas, etc.

[1] Historically these areas were dominated by Low-elevation sagebrush steppe.

TABLE 3-3. VEGETATION COVER TYPE AND CHEATGRASS INVASION ACREAGES AND PERCENTAGES, IN THE PLANNING AREA AND BY FIELD OFFICE

Planning Area (Acres)			Field Office Acres of Vegetation Cover Type (% of veg-type invaded by cheatgrass) [1]			
Vegetation Cover Type (% of Planning Area)		Acres of Cheatgrass (% of veg-type)	PFO	USFO	BFO	SFO
Low-elevation Shrub	1,531,220 (28)	391,950 (26.00)	38,244 (6.00)	913,184 (45.00)	385,496 (39.00)	415,308 (23.00)
Perennial Grass[2]	1,436,031 (27)	529,133 (37.00)	108,255 (18.00)	470,002 (23.00)	309,059 (31.00)	548,808 (31.00)
Invasive Annual Grass[2,3]	330,581 (6)	330,182 (NA)	32 (0.01)	36 (<0.01)	49,098 (5.00)	281,362 (16.00)
Mid-elevation Shrub	848,782 (16)	38,775 (5.00)	143,598 (23.00)	231,519 (11.00)	31,174 (3.00)	311,194 (18.00)
Juniper (Including juniper encroachment in Mid-elevation Shrub)	90,966 (2)	12,729 (14.00)	26,102 (4.00)	5,380 (0.27)	59,712 (6.00)	4 (<0.01)
Dry Conifer	88,768 (2)	12 (0.01)	49,022 (8.00)	20,132 (0.99)	376 (0.04)	19,241 (1.00)
Aspen/Conifer	56,290 (1)	76 (0.10)	40,395 (7.00)	10,276 (0.51)	1,232 (0.13)	4,441 (0.25)
Mountain Shrub	339,815 (6)	14,523 (5.00)	186,869 (30.00)	13,035 (0.64)	38,825 (4.00)	11,901 (0.67)
Wet/Cold Conifer	24,965 (<1)	268 (2.00)	678 (0.06)	14,095 (0.70)	833 (0.08)	9,388 (0.53)
Riparian	30,903 (<1)	1,962 (6.00)	6,823 (1.11)	15,690 (0.78)	2,338 (0.24)	6,153 (0.35)
Salt Desert Shrub	37,792 (<1)	5,293 (14.00)	346 (0.06)	27,409 (1.40)	10,177 (0.08)	0
Vegetated Rock/Lava	582,057 (11)	80,591 (14.00)	16,387 (3.00)	304,794 (15.00)	94,604[4] (10.00)	166,786 (9.00)
TOTALS	5,398,170	1,405,494	616,751	2,025,552	982,924	1,774,586

[1] ≥ 5% cover of cheatgrass.

[2] Formerly Low-elevation and Mid-elevation Shrub. Total historical low-elevation sagebrush acreage estimated at 3,518,883 acres, or 65.2% of the BLM-administered lands. Approximately half of the Low-elevation Shrub has been converted to Invasive Annual Grass cover type or Perennial Grass cover type.

[3] Not an historical cover type, formerly Low-elevation and Mid-elevation Shrub.

[4] Due to changes in field office boundaries, this acreage is now located in the Shoshone Field Office.

3.2.1 CURRENT CONDITIONS AND TRENDS

For the purposes of analysis, the vegetation types discussed in the Final EIS are described as homogenous or stand alone cover types. In reality, they are not evenly distributed across the landscape but merge and blend themselves in association with each other. The most common vegetation types found in association with each other are Juniper, Mid-elevation Shrub, Mountain Shrub, Aspen/Conifer, Dry Conifer and Riparian. The percentage of a vegetation type found in association with others varies depending on aspect, soils, elevations, and precipitation. Similary, Annual and Perennial Grass areas, Riparian, Salt Desert Shrub and Vegetated Lava vegetation types are found in association with the Low-elevation Shrub vegetation type. This association of vegetation types tends to be more homogenous and found on larger areas and in closer proximity to one another with less mixing than the previously mentioned vegetation types found in association with each other. The vegetation types discussed are the principal biotic components of the ecosystem. Vegetation provides wildlife cover and browse, nesting and rearing habitat, and a wide variety of other ecosystem benefits. Vegetation forms the protective cover of watersheds and produces the biomass that characterizes cover types and their habitats. Vegetation also functions in the hydrologic cycle as a dynamic interface between the soil and the atmosphere. It intercepts precipitation, retards overland flow, retains soil water by root absorption, and transports water back to the atmosphere via stems and leaves (evapo-transpiration).

Determinations of current FRCC were made for cover types in the four field offices. FRCC values may vary at the site-specific level within a single cover type or field office. A full description of how FRCC and vegetation condition was determined is found in Appendix C. Historical fire rotations, fire severities, and fire size and patterns were estimated from relevant literature and professional judgments; see Appendix C for a description of Fire Regime Groups, Fire Rotation (Return Intervals), and Fire Severity. Current composition of vegetation by age classes and current FRCC are presented in Tables 3-4 through 3-18. The vegetation resources of the planning area are the central issue of this EIS. This section discusses the current and historical vegetation of the planning area and its trend under current management, including cover types and species, federally-listed threatened and endangered (T&E) and BLM-Sensitive species, noxious and invasive weeds, and the influence of fire. Plants found in the planning area that are important to Native Americans and how they are used can be found in Appendix N.

The cover types listed in Table 3-2 and Table 3-3 were aggregated from 51 cover types originally classified by the Gap Analysis Program (GAP) for southern Idaho (Scott et al. 2002 [1993]). The GAP is used to assess the conservation status of native vertebrate species, habitat loss, and natural land cover types at a regional level to meet the needs of natural resources management agencies like the BLM. GAP uses Landsat Thematic Mapper satellite images to generate the digital maps from which land cover patterns are delineated. (The minimum mapping unit is 30 m^2, a landscape-level resolution sufficient for regional-level planning; however, this might not represent actual acres on the ground.)

The distribution of the cover types across the planning area is presented in Figure 3-1. These cover types are based on coarse-scale approximations used to define the mapping units. Within a mapping unit, species composition, species distribution, habitats, and cover type structures may vary widely due to various factors such as environmental gradients, ecotones, natural variations, and site-specific historical influences (e.g., fire, grazing, landslides). If a particular species is noted in a cover type in Table 3-1, it means that the species is one of the principal species used to define the cover type, but it does not mean that the species is found *only* in that cover type. A species may be found in a number of cover types, where its presence would be more or less dominant. For example, mountain big sagebrush is primarily associated with the more mesic sites of Mid-elevation Shrub, but it can also be found at higher elevations in some Mountain Shrub cover types.

Fire plays an essential ecological role in regenerating and maintaning a diverse mosaic of healthy cover types across ecosystems. Historically (prior to 1900), the planning area's landscape would have been dominated by the vegetation characteristic of FRCC 1.

Particular areas (e.g., watersheds, benches, swales, plains) would have been in various stages of recovery from wildland fires and other disturbances resulting in a mosaic of seral stages across the landscape.

Over the past century, fire suppression, introduction of non-natives (e.g., cheatgrass and medusahead wildrye), and other land management practices have altered fire ecology, species composition, and the dynamics of ecological succession across the planning area landscape. The vegetation seral mosaic across the planning area has been altered and certain species and/or seral stages now predominate, moving landscapes toward FRCC 3. Since approximately 1950, there have been large-scale conversions from sagebrush steppe to urban and agricultural development.

Cheatgrass invasion dates from before the 1930s in southern Idaho. Today, in undeveloped areas of the planning area, a large portion of the historical sagebrush steppe has further degraded due to cheatgrass invasion and past uses. Consequently, some of the planning area's ecosystems are at risk of ecological breakdown (e.g., loss of more sagebrush steppe habitat). Similarly, long-term fire suppression in the forested landscape has resulted in fewer early-seral and mid-seral stages and in more late-seral stages, often with high fuel loads.

3.2.1.1 Low-elevation Shrub, Perennial Grass, and Invasive Annual Grass

Presently, the Low-elevation Shrub type is dominated by Wyoming big sagebrush *(Artemisia tridentata* subsp. *wyomingensis)* and basin big sagebrush *(Artemisia tridentata* subsp. *tridentata)*, with approximately 26 percent invaded by cheatgrass. West to east across the planning area, the Low-elevation Shrub separates into two zones at approximately the midpoint of Craters of the Moon National Monument and Preserve.[1] The western portion is characterized by less than 12 inches of precipitation per year, warm soils, and historically degraded rangelands; it also has been most heavily impacted by cheatgrass. The eastern portion has slightly higher precipitation, cooler soils, and more intact sagebrush steppe. Higher precipitation sagebrush steppe is probably more resistant to cheatgrass and would probably respond better to treatments than the drier portions.

[1] Approximately 113 degrees, 20 minutes east longitude.

3.2.1.1.1 Shrubs

At present, Low-elevation Shrub dominates approximately 28 percent of the planning area's BLM-administered lands. Basin big sagebrush occurs on deep and well-drained sandy soils, at low to mid-elevations, and 10-inch to 16-inch precipitation zones. Wyoming big sagebrush occurs on finer-textured, shallow soils that have limited depths of water infiltration, at low-elevations to mid-elevations and 8-inch to 12-inch precipitation zones. Three-tip sagebrush is locally dominant north of the Snake River over much of the low-elevation sagebrush. Other common shrub species are rubber or gray rabbitbrush *(Chrysothamnus nauseosus)*; yellow, green, or Douglas rabbitbrush *(Chrysothamnus viscidiflorus)*; low, little, or gray sagebrush *(Artemisia arbuscula)*; black sagebrush *(Artemisia nova)*; and silver sagebrush *(Artemisia cana)*. Gray and green rabbitbrushes, both of which sprout, may be a co-dominant with sagebrush. Low sagebrush and silver sagebrush cover types are minor cover types that are minimally influenced by fire.

Wyoming sagebrush may produce large numbers of viable seeds, but not in all years. Large burn areas may require decades to naturally reseed (U.S. Department of Agriculture [USDA] 2002a). Fire effects on soil seedbanks and regeneration range from none in Wyoming big sagebrush (USDA 2002a) to reduced viability and germination in basin big sagebrush (USDA 2002b). Some areas supporting Wyoming and basin big sagebrush have become dominated by three-tip sagebrush after large burns. Three-tip sagebrush may be either seral or climax, depending on the site potential, but generally is climax only on sites that are colder and wetter than those that support Wyoming sagebrush, but not as cold and wet as those sites that support mountain big sagebrush. Replacing Wyoming and basin big sagebrush by three-tip sagebrush has implications for fire ecology and wildlife habitat (e.g., sage grouse).

3.2.1.1.2 Perennial Grass

At present, Perennial Grass dominates approximately 27 percent of the planning area's BLM-administered lands. Perennial Grass is composed of native sites with Idaho fescue *(Festuca idahoensis)*, bluebunch wheatgrass *(Agropyron spicatum)*, western wheatgrass *(Agropyron smithii)*, thickspike wheatgrass *(Agropyron dasystachyum)*, Thurber's needlegrass *(Achnatherum thurberiana)*, Sandberg bluegrass *(Poa secunda)*, and Indian ricegrass *(Oryzopsis hymenoides)*, as well as seedings of native and non-native perennial grasses such as crested wheatgrass *(Agropyron cristatum)*, Siberian wheatgrass *(Agropyron fragile)*, Snake River wheatgrass *(Elymus wawawaiensis)*, and bluebunch wheatgrass.

Historically, native Perennial Grass formed part of the seral mosaic of the sagebrush steppe habitat; although, it is unclear how widespread they once may have been represented across the landscape. Perennial Grass is considered an intermediate seral stage in the sagebrush steppe. Perennial Grass would eventually develop into diverse sagebrush steppe habitat if undisturbed for 20 to 70 years without impacts from wildland fires. Other Perennial Grass cover types expanded in portions of the planning area due to the eradication of shrubs, especially sagebrush species, or by wildland fires on relatively good condition rangelands.

Non-native perennial grasslands, those dominated by crested wheatgrass or other non-native species, are stable cover types that do not trend toward recovery to sagebrush steppe habitat as quickly as native perennial grasslands, though they are more preferred than cheatgrass.

Sagebrush re-establishment in crested wheatgrass stands is apparent on portions of the planning area. On more suitable sites and in higher precipitation zones, sagebrush would reclaim areas containing non-native seedlings in 20 or 30 years. However, it is unlikely that native understory components would return to historical, pre-disturbance proportions in 20 to 30 years, without proactive intervention to diversify the community.

3.2.1.1.3 Invasive Annual Grass

Invasive Annual Grass cover type was not part of the planning area's historical vegetation. At present, Invasive Annual Grasses have invaded approximately 26 percent of the planning area's cover types, primarily in former sagebrush steppe. Unfortunately, cheatgrass forms a relatively stable state but dysfunctional ecosystem in this cover type (Laycock 1991). Once the cheatgrass fire regime becomes established in a region, it is extremely difficult to regain a more desirable, relatively stable wildland system. Figure 3-1 depicts areas with a high cover of cheatgrass, including Invasive Annual Grass cover types, Perennial Grass cover types, and degraded sagebrush steppe with a high cover of cheatgrass in the understory (i.e., areas with greater than 20 percent cover).

Cheatgrass and medusahead wildrye are the two principal invasive annual species in the planning area. During the fire year, the presence of cheatgrass and medusahead wildrye in a wildland cover type extends the time during which the cover type is susceptible to wildland fire ignitions. Both cheatgrass and medusahead wildrye are opportunistic winter annuals that germinate anytime between autumn and spring when temperatures and soil moisture are suitable. Native grasses, on the other hand, go dormant through winter and are slower to develop in the spring. In the summer, cheatgrass and medusahead wildrye dry out four to six weeks earlier than perennial grasses and form a fine-textured, highly flammable fuel. These Invasive Annual Grasses may also extend the fire year by one to two months in the fall when perennial grasses can green-up following periods of moisture in the autumn (Paysen et al. 2000). Seeds may remain viable for a year or more (Pyke and Novak 1994) and are known to remain viable for up to 11 years under dry storage conditions (USDA 2002c). Cheatgrass seed production can be impacted by RxFire when it is applied during the brief period between the purple stage and when the seeds are dropped a short time later.

The criteria for establishing when cheatgrass becomes an invasive concern or a fire concern are not readily assigned. As noted previously, degraded sites are most susceptible to Invasive Annual Grass invasion after disturbance; an abundance of cheatgrass in the understory enhances the likelihood of fire spread and conversion of sagebrush steppe to Invasive Annual Grass cover type (USDA 2002a).

Disturbances such as wildland fire are not wholly responsible for expanding cheatgrass in southern Idaho. Dryland farming ventures in the 1930s contributed to the spread of cheatgrass in this region. Since then, wildland fire has become the dominant factor for cheatgrass's spread. There is also strong evidence that cheatgrass can invade sites that have remained ungrazed for over 20 years at the Idaho National Laboratory (INL) (Anderson and Inouye 2001) and in kipukas at Craters of the Moon National Monument and Preserve. At the INL, transects from the 1950s showed cheatgrass invasion by 1976. Cheatgrass at the INL, however, is not the fire/fuels problem that it is on some BLM-administered lands. Areas with intact biological crusts are more resistant to cheatgrass invasion, as the crusts form a physical barrier to seed penetration and germination (Belnap et al. 2001). This may, in turn, reduce hazardous fuel loads and increase continuities in the interspaces so that, when a cover type burns on a small scale, a mosaic is created, consisting of relatively unburned or lightly burned islands between burn areas.

The Sitewide Field Area within INL still retains much of its historical ecological character. Permanent plots were established in 1950, and vegetation species cover and density data were collected and analyzed at 5-year to 10-year intervals through 1995. By 1950, heavy grazing and a 17-year drought had resulted in very low cover of perennial grasses (0.5 percent), low density of perennial forbs, and dominance by sagebrush and other shrubs (17 percent). Since 1950, however, a major portion of the INL has been free of livestock grazing and subsequent vegetation dynamics have been attributed to natural fluctuations in the environment. Recent ecological history of the INL shows that cheatgrass invaded undisturbed sites sometime between 1965 and 1975. Anderson and Inouye (2001) surmise that:

- In spite of continued dominance by shrubs, perennial grasses have increased, resulting in a 13-fold increase by 1975, and more recently, fluctuations between 1.4 and 4 fold.
- There has been little change in aggregate species richness for shrubs and grasses, while mean species richness per plot has increased due to expansion of previously isolated populations (rather than immigration of new species).
- Resistance to invasion, total cover, and total productivity are all correlated with species richness.
- Cheatgrass appeared in the ungrazed area of INL in the 1975 censuses and has increased since then.

Of 108 plant species recorded in 1995, the three plant species with highest covers were sagebrush (9.5 percent), rabbitbrush (7.7 percent), and cheatgrass (2.3 percent).

3.2.1.1.4 Perennial Forbs

Perennial forbs are also important understory components of the sagebrush steppe and may include salsify *(Tragopogon dubius)*, Hooker's balsamroot *(Balsamorhiza hookeri)*, narrow-leaf collomia *(Collomia linearis)*, blue-eyed Mary *(Collinsia parviflora)*, pink microsteris *(Microsteris gracilis)*, shaggy fleabane daisy *(Erigeron pumilus)*, Indian paintbrush *(Castilleja* spp.*)*, owl-clover *(Orthocarpus lutea)*, and buckwheat *(Eriogonum* spp.*)*.

3.2.1.1.5 Fire Ecology

Historically, infrequent natural fires of stand replacement helped to maintain a mosaic of shrublands and perennial grasslands throughout the sagebrush steppe ecosystem. Pre-settlement stand replacing fire frequencies for Low-elevation Shrub are estimated to vary from 60 to 110 years (85 years midrange) for basin big sagebrush and Wyoming sagebrush types (Whisenant 1990; Peters and Bunting 1994; Miller 2001). Accordingly, Low-elevation Shrub, Perennial Grass, and Invasive Annual Grass are classified as Fire Regime IV (Hardy et al. 2001) See Appendix C for an explanation of Fire Regimes I through V (Hardy et al. 2001).

Most sagebrush species are not fire-tolerant, except for the local genotype of three-tip sagebrush. Wyoming big sagebrush steppe cover types had low fuel loads (i.e., 200 pounds per acre [lb/ac] to 900 lb/ac) and were characterized by patchy fires that produced a mosaic of burned, recovering, or unburned lands (USDA 2002a). Invasive Annual Grass invasion has increased fine fuels, resulting in frequent large fires. Large fires impact the existing sagebrush steppe habitat and facilitate expansion of cheatgrass.

Fuel loads in perennial grasslands range from 250 lb/ac to greater than 2,000 lb/ac. Because perennial grasslands are derived from burned sagebrush steppe cover types, the dominant perennial grasses still retain the same ecological characteristics that they exhibit in sagebrush steppe. Perennial grasses on the planning area reportedly exhibit good recovery after severe fire. Growth points in these grasses are compressed near the ground at the base of shoots (i.e., root crowns in bunchgrasses and lateral shoots in sod-formers). Most perennial grasses respond by resprouting from these basal growing points following fire. The primary determinant of fire response in perennial grasslands is fire residence time. Fast-moving fires have a short residence time and seldom cause substantial mortality. Slow moving fires, however, have longer residence times and greater severity. Mortality to perennial grasses is high under these conditions as the fire spends more time in the vegetative base of the plant. With most natural ignitions, the predominant fire spread is a fast moving fire. Because native grasslands are seral to sagebrush steppe, natural/historical fire rotations of 60 to 110 years for Low-elevation Shrub and a Fire Regime IV (Hardy et al. 2001) are similar.

Once cheatgrass dominates a site, the fire regime is altered with fire being more frequent. Shortened natural/historical fire rotations impact perennial vegetation by killing the tops of the plants and allowing little time (few growing seasons) between recurrent fires. Fuel loads in Invasive Annual Grass-dominated sites vary between 0 lb/ac and 2,000 lb/ac, depending upon the site characteristics and annual climate. In some locations, areas dominated by Invasive Annual Grasses have experienced multiple burns on the same area (e.g., 6 times since 1939 at one locale in the Big Desert). Typical fire regimes for FRCC in Low-elevation Shrub are shown below in Table 3-4.

TABLE 3-4. TYPICAL FIRE REGIMES FOR FIRE REGIME CONDITION CLASS (FRCC) 1, 2, AND 3, FOR LOW-ELEVATION SHRUB (INCLUDES PERENNIAL AND INVASIVE ANNUAL GRASS)

	FRCC 1	FRCC 2	FRCC 3
Natural Fire Rotation	60-110 years	15-60 years	<10 years
Fire Severity	Low-medium: Stand replacement depending on fire weather conditions.	Medium-high: Stand replacement.	High: Stand replacement.
Fire Size and Pattern	Small to moderate burning in a mosaic pattern.	Moderate to large with little to no mosaic patterns.	Majority of fires large and contiguous.

Generally, these cover types require fewer disturbances for their recovery and maintenance than what has occurred in the past 30 years OR on the east side of the planning area where large homogeneous patches of dense sagebrush steppe (> 30% shrub canopy cover) still exist and Invasive Annual Grasses are not a major component of the understory, more small-scale disturbances are required for recovery and maintenance than what has occurred in the past 30 years.

Current condition of the Low-elevation Shrub, Perennial Grass, and Invasive Annual Grass cover types is given in Table 3-5 for each of the field offices. Current condition (percentage) is analyzed by proportions of age class (roughly equivalent to seral stage) and, when present, uncharacteristic vegetation. Current FRCC, a landscape-level risk descriptor, is also given for each field office.

TABLE 3-5. CURRENT CONDITIONS (%) OF LOW-ELEVATION SHRUB, PERENNIAL GRASS, AND INVASIVE ANNUAL GRASS BY AGE CLASS AND CURRENT FIRE REGIME CONDITION CLASS (FRCC), BY FIELD OFFICE

Vegetation Cover Type and Age Class	Field Offices							
	USFO		PFO		BFO		SFO	
	Condition	FRCC	Condition	FRCC	Condition	FRCC	Condition	FRCC
Perennial Grass: <15-y	29%		32%		23%		3%	
Grass/shrub mix: 15-30-y	1%		5%		7%		2%	
Shrub/grass mix: >30-y	48%	2	24%	2	22%	2	28%	3
Crested wheatgrass	<1%		10%		15%		25%	
Cheatgrass and/or weeds	22%		29%		33%		42%	

- FRCC 1: Results in a 14:14:52 mixture of early, mid, and late successional stages arranged in a mosaic pattern across the landscape. The remaining 20 percent of the acreage is in an uncharacteristic state due to the presence of annual and/or introduced grasses. Fifty-two percent of the landscape has shrub cover ranging between 10 percent and 25 percent with understories and interspaces dominated by native herbaceous perennials or a cover type that functionally mimics the characteristics of the natural fire regime in its frequency, behavior, intensity, and severity.
- FRCC 2: Results in a landscape with more than half the Low-elevation Shrub in either an alternate stable state (cheatgrass monoculture) and/or an early stage of succession. When shrub cover is less than 10 percent, sites are dominated by native perennial grasses with some intrusion by Invasive Annual Grasses. Under these circumstances, lower frequency fires would facilitate recovery of these sites to domination by shrubs and native perennial grasses while the present, altered fire regimes would hasten their conversion to Invasive Annual Grass (i.e., alternate stable state of succession).
- FRCC 3: Results in a landscape with the majority of Low-elevation Shrub in an alternate stable state of succession. Invasive Annual grasses dominate with few desirable perennials and little to no shrub cover.

3.2.1.2 Mid-elevation Shrub, Juniper, and Juniper Encroachment

The Mid-elevation Shrub, Juniper, and juniper encroachment cover type is classified as Fire Regime II (Hardy et al. 2001). The Mid-elevation Shrub occurs at mid-elevations to high-elevations (above 7,500 feet, 14-inch to 20-inch precipitation zones), with cooler soils, and more intact native cover types than Low-elevation Shrub. This cover type is dominated by mountain big sagebrush *(Artemisia tridentata* subsp. *vaseyana)* and appears less vulnerable to conversion to Invasive Annual Grass than Low-elevation Shrub. Other common shrub species are rubber or gray rabbitbrush; yellow, green, or Douglas rabbitbrush; low, little, or gray sagebrush; black sagebrush; and bitterbrush *(Purshia tridentata)*. Juniper has invaded some Mid-elevation Shrub cover types as a result of fire suppression.

Depending on soil type and depth, perennial grasses such as Idaho fescue *(Festuca idahoensis)*, bluebunch wheatgrass, and Sandberg bluegrass may dominate the understory of Mid-elevation Shrub cover types. Perennial forbs are also important understory components of the Mid-elevation Shrub and may include salsify, nodding microseris *(Microseris nutans)*, arrowleaf balsamroot *(Balsamorhiza sagittata)*, narrow-leaf collomia, blue-eyed Mary, pink microsteris, Indian paintbrush, owl-clover, and buckwheat. Tapertip hawksbeard *(Crepis acuminata)* is a desirable native forb that declines with heavy livestock grazing. Invasion of cheatgrass is most common on frequently disturbed sagebrush steppe sites (USDA 2002a).

Juniper woodlands occupy approximately 2 percent of the planning area's BLM-administered lands. The Juniper cover type includes stands of natural Juniper (approximately 10,500 acres), pinyon-juniper (approximately 5,000 acres), and juniper encroached Mid-elevation Shrub (approximately 75,500 acres). Some of the natural juniper stands occur in fire-safe habitats.

Juniper is best established between 4,500 feet and 6,000 feet on a wide variety of soils and in the 10-inch to 15-inch precipitation zones. Three species of juniper may be encountered on the planning area, Rocky Mountain Juniper *(Juniperus scopulorum)*, Utah Juniper *(Juniperus osteosperma)*, and Western Juniper *(Juniperus occidentalis)*; fire ecologies for these three species are similar. Juniper woodlands consist of a diversity of habitats that vary in understory species and stand densities. Junipers are considered climax species for pinyon-juniper habitats, while in sagebrush/shrub steppe habitats, less than 5 percent juniper can enhance wildlife habitat. Species compositions and stand densities vary with elevation; drier sites tend to have widely spaced junipers.

Single-needle pinyon pine *(Pinus monophylla)* occurs as isolated stands on approximately 5,000 acres in the vicinity of the City of Rocks National Reserve, Almo, Cassia County. Pinyon pines occur with juniper trees at intermediate elevations in dry upland hills at precipitation ranges from 10 inches to 16 inches. In good years, pinyon pine cones yield an abundance of nutritious nuts, which were a traditional food and remain an important tradition of Native Americans today. It is estimated that pinyon and juniper woodlands have increased tenfold over the past 130 years throughout the Intermountain West (Miller and Tausch 2001). Expansion has been largely at the expense of sagebrush-bunchgrass cover types, though pinyon and juniper have also made significant invasions into low sagebrush, black sagebrush, bitterbrush, and curl-leaf mountain mahogany, and aspen and Riparian cover types (Miller and Tausch 2001). In central Oregon, western juniper expansion began between 1875 and 1885, with expansion peaking between 1905 and 1925 (Miller and Rose 1999). Western juniper expansion has been attributed to combined influences of livestock grazing, reductions in fine fuels, climatic changes (mild temperatures and above average precipitation in the late 1880s and early 1900s), and reduction in wildland fires due to fire suppression and cessation of burning by Native Americans (Miller et al. 2001; USDA 2002e).

Fire Ecology

Historically, relatively frequent fires maintained a mosaic of seral stages throughout the Mid-elevation Shrub. Pre-settlement, stand-replacing fire frequencies have been estimated as varying between 10 and 25 years (18 years midrange) for mountain big sagebrush (Houston 1973; Harniss and Murray 1973). Perennial grasses typically recover these burned areas until shrubs become reestablished. Fuel loads vary widely from near 0 lb/ac to 2,000 lb/ac. Fine fuels in mountain big sagebrush vary between 500 lb/ac and 1,250 lb/ac. Mid-elevation Shrub is classified as Fire Regime II (Hardy et al. 2001).

Stand replacing fire frequency for pinyon-juniper is estimated to range from 200 years to more than 300 years (250 years midrange) (Goodrich and Barber 1999). Surface fires readily kill thin-barked young juniper trees and were historically relatively frequent in areas on which Juniper has now encroached. Fire was probably responsible for the lack of encroachment into sagebrush steppe habitat. Typical crown fuels are 3.6 tons per acre (tons/ac) for foliage and 1.8 tons/ac for 0 inch to 0.25 inch branchwood. Typical fuel loads for larger woody material are not readily available, though 11 tons/ac is considered heavy. It is generally agreed that fire was the most important natural disturbance impacting the distribution of juniper and/or pinyon-juniper woodlands before the introduction of livestock in the nineteenth century (Miller and Rose 1999).

Burkhardt and Tisdale (1976; USDA 2002d) concluded that fire frequencies of 30 to 40 years would control Juniper expansion into mountain big sagebrush cover types. Western juniper may be long-lived (e.g., 1,000 years or more) with western juniper found in fire-proof spots (e.g., broken, rocky terrain) (USDA 2002e). Based on reports for Rocky Mountain juniper, high severity, stand-replacing fires in mature stands may have return intervals in excess of 400 to 600 years (USDA 2002e). Juniper and pinyon-juniper are classified as Fire Regime V (Hardy et al. 2001). Typical fire regimes for FRCC in Juniper and Mid-elevation Shrub are shown below in Table 3-6 and Table 3-7.

TABLE 3-6. TYPICAL FIRE REGIMES FOR FIRE REGIME CONDITION CLASS (FRCC) 1, 2, AND 3, FOR MID-ELEVATION SHRUB (INCLUDING JUNIPER ENCROACHMENT AREAS)

	FRCC 1	FRCC 2	FRCC 3
Natural Fire Rotation	10-25 years	25-60 years	>60 years
Fire Severity	Low-medium: Mixed with some stand replacement depending on fire weather conditions	Medium-high: Mixed with a greater proportion of stand replacement	High: Mostly stand replacement
Fire Size and Pattern	Small to moderate burning in a mosaic pattern	Moderate to large with little to no mosaic patterns	Large and contiguous
Generally, this cover type requires more disturbances than what has occurred in the past 30 years for its recovery and maintenance OR on the west side of the planning area where Invasive Annual Grasses have increased the fine fuel loading and fire frequency, this cover type requires fewer disturbances than what has occurred in the past 30 years for its recovery and maintenance.			

TABLE 3-7. TYPICAL FIRE REGIMES FOR FIRE REGIME CONDITION CLASS (FRCC) 1, 2, AND 3, FOR JUNIPER (GROWING ON FIRE-RESISTANT SITES)

	FRCC 1	FRCC 2	FRCC 3
Natural Fire Rotation	200 to 300+ years	100-200 years	<100 years
Fire Severity	High: Causing stand replacement	Mixed: Stand replacement depending on fire weather conditions	Mixed: Stand replacement depending on fire weather conditions
Fire Size and Pattern	Large and contiguous	Moderate to large burning in a contiguous pattern	Moderate to large burning in a contiguous pattern
This cover type has been little affected by disturbances over the past 30 years.			

Current condition of the Mid-elevation Shrub (including juniper encroachment areas) cover type is given in Table 3-8 for each of the field offices. Current condition (percentage) is analyzed by proportions of age class (roughly equivalent to seral stage) and, when present, uncharacteristic vegetation. Current FRCC, a landscape-level risk descriptor, is also given for each field office.

TABLE 3-8. CURRENT CONDITIONS (PERCENTAGE) OF MID-ELEVATION SHRUB (INCLUDING JUNIPER ENCROACHMENT ACRES) BY AGE CLASS AND CURRENT FIRE REGIME CONDITION CLASS (FRCC), BY FIELD OFFICE

Vegetation Cover Type and Age Class	Field Offices							
	USFO		PFO		BFO		SFO	
	Condition	FRCC	Condition	FRCC	Condition	FRCC	Condition	FRCC
Perennial Grass: <5-y	<1%		<1%		1%		0%	
Grass/shrub mix: 15-30-y	7%		8%		6%		4%	
Shrub/grass mix: >15-y	86%	3	72%	3	63%	3	91%	3
Juniper encroachment	2%		13%		23%		<1%	
Cheatgrass/weeds	5%		6%		7%		5%	

- FRCC 1: Results in a nearly even mixture of early, mid, and late successional stages arranged in a mosaic pattern across the landscape. One-third to one-half of the Mid-elevation Shrub can be characterized as having a shrub canopy cover of approximately 10 percent to 25 percent. These areas have an understory dominated by native forbs and grasses or an herbaceous cover type that functionally mimics the characteristics of the natural fire regime (i.e., introduced Perennial Grass and forb species). There is little to no Invasive Annual Grasses present in the understory. In areas where juniper woodlands occur, juniper trees are limited to fire-resistant sites through periodic disturbance. Only small amounts of dead woody material are present.
- FRCC 2: Results in a landscape with more than one-half the Mid-elevation Shrub in either an alternate stable state (cheatgrass monoculture) or an early stage of succession (characterized by having 10 percent or less shrub canopy cover and a mixture of

Perennial and Invasive Annual Grass and forb species in the understory), OR, in a landscape that has more than one-half the Mid-elevation Shrub in an alternate stable state or late stage of succession (characterized by having late-seral stage shrubs with greater than 25 percent canopy cover and little to no understory grass or forb species present). Native species richness across the landscape is diminished under both circumstances. In areas where juniper woodlands occur, juniper trees have expanded out from the fire-resistant areas and are intermittently spaced through some or all of the Mid-elevation Shrub. There is a reduction or loss of shrub canopy cover and an increase in dead woody material where juniper encroachment is occurring.

- FRCC 3: Results in a landscape with the majority of Mid-elevation Shrub in an alternate stable state of succession (characterized by having less than 10 percent shrub canopy cover and Invasive Annual Grasses dominating the herbaceous understory), OR, in a landscape with the majority of Mid-elevation Shrub in a late stage of succession (characterized by having more than 30 percent shrub canopy cover and little to no native grasses and forbs in the understory) or an alternate stable state of succession (juniper woodland monoculture). Native species richness across the landscape is severely compromised under both circumstances. In areas where juniper woodlands occur, juniper trees have expanded their range out into the Mid-elevation Shrub with tree densities high enough to partially or fully exclude a shrub and/or herbaceous understory. Large amounts of dead woody material are present.

3.2.1.3 Mountain Shrub

Mountain Shrub occupies approximately 5 percent of the planning area and occurs as a transition cover type between sagebrush steppe and conifer cover types. Mountain Shrub is found at moderately high elevations, often associated with Douglas-fir and aspen cover types, on sites that are more mesic than sagebrush steppe (e.g., 14-inch to 16-inch precipitation zones) but drier than aspen (18-inch to greater than 24-inch precipitation zones). Mountain Shrub is usually found on north and east slopes that tend to be cooler and moister than south and west aspects. Mountain Shrub is a highly diverse cover type with chokecherry *(Prunus virginiana)*, serviceberry *(Amelanchier alnifolia)*, currant *(Ribes* spp.*)*, mountain snowberry *(Symphoricarpos oreophilus)*, and elderberry *(Sambucus racemosa)*, often intermingled with mountain big sagebrush and Mountain Shrub mahogany. The Mountain Shrub cover type, with its high productivity and diverse herbaceous understory, provides important biodiversity, wildlife habitat, and protective ground cover to the ecosystem.

<u>Fire Ecology</u>

Stand-replacing fires occur from 25 to 100 years (63 year midrange) in Mountain Shrub (Loop and Gruell 1973), though natural/historical fire rotations may vary widely with changes in elevation, aspect, site moisture, and the associated forest or woodland cover types. Fuel loads also vary among cover types. All species of Mountain Shrub resprout after fire, except for mountain big sagebrush and mountain mahogany. Mountain Shrub cover types generally recover rapidly following wildland fire and are considered to be fire-tolerant. Mountain Shrub is classified as Fire Regime III (Hardy et al. 2001). Typical fire regimes for FRCC in Mountain Shrub are shown below in Table 3-9.

TABLE 3-9. TYPICAL FIRE REGIMES FOR FIRE REGIME CONDITION CLASS (FRCC) 1, 2, AND 3, FOR MOUNTAIN SHRUB

	FRCC 1	FRCC 2	FRCC 3
Natural Fire Rotation	10-50 years	50-100 years	100+ years
Fire Severity	Low-medium: Mixed with stand replacement depending on conditions and fire weather	Medium-high: Mixed with stand replacement depending on conditions and fire weather	High: Stand replacement depending on conditions and fire weather
Fire Size and Pattern	Small to moderate burning in a mosaic pattern	Moderate burning in a mosaic pattern or large burning in a contiguous pattern	Large and contiguous
This cover type requires more disturbances for its maintenance than what has occurred in the past 30 years.			

Current condition of the Mountain Shrub cover type is given in Table 3-10 for each of the field offices. Current condition (percentage) is analyzed by proportions of age class (roughly equivalent to seral stage) and, when present, uncharacteristic vegetation. Current FRCC, a landscape-level risk descriptor, is also given for each field office.

TABLE 3-10. CURRENT CONDITIONS (%) OF MOUNTAIN SHRUB BY AGE CLASS AND CURRENT FIRE REGIME CONDITION CLASS (FRCC), BY FIELD OFFICE

Vegetation Cover Type and Age Class	Field Offices							
	USFO		PFO		BFO		SFO	
	Condition	FRCC	Condition	FRCC	Condition	FRCC	Condition	FRCC
Early seral shrub: <10 y	<1%		<1%		1%		2%	
Mid- seral shrub: 10-20 y	3%	3	10%	3	5%	3	2%	3
Late seral shrub: >20 y	97%		90%		94%		96%	

- FRCC 1: Results in a nearly even mixture of successional stages arranged in a mosaic pattern across the landscape. One-third to one-half of the Mountain Shrub cover type can be characterized as having approximately 10 percent to 30 percent shrub canopy cover with vigorous leader growth occurring during years of average to above-average precipitation. Susceptibility to insect attack and disease is low. The amount of live woody material in shrub stands far exceeds the amount of dead woody material. Understory vegetation includes a variety of native grasses and forbs with little to no invasive/noxious weeds present.
- FRCC 2: Results in more mid successional and late successional Mountain Shrub cover types than early successional stages across the landscape. More than one-half of the Mountain Shrub stands can be characterized as having approximately 30 percent to 45 percent canopy cover with diminished amounts of leader growth regardless of yearly precipitation. Susceptibility to insect attack and disease is moderate. The amount of live woody material in shrub stands is even or only slightly greater than the amount of dead woody material. Invasive/noxious weeds may be present in the understory at low or moderate levels.

- FRCC 3: Results in a landscape predominately made up of late successional Mountain Shrub cover types. The majority of Mountain Shrub stands can be characterized as having greater than 45 percent canopy cover with only minimal amounts of yearly leader growth occurring. Susceptibility to insect attack and disease is high. Shrub stands are composed of more dead woody material than live woody material. Invasive/noxious weeds may be present in low, moderate, or high levels.

3.2.1.4 Aspen/Conifer and Dry Conifer

The Dry Conifer cover type occupies approximately 2 percent of the planning area's BLM-administered lands. Principal species of Dry Conifer include Douglas-fir *(Pseudotsuga menziesii)*, limber pine *(Pinus flexilis)*, and Ponderosa pine *(Pinus ponderosa* var. *scopulorum)*. Douglas-fir occurs between 6,000 feet and 8,000 feet on variable soils and in 20-inch to 30-inch precipitation zones, typically as isolated patches on cool north slopes. Douglas-fir stands often occur between ponderosa and spruce-fir cover types. Ponderosa pine occurs between approximately 5,000 feet and 7,600 feet on a variety of soils and in 15-inch to 30-inch precipitation zones.

The Aspen/Conifer cover type includes pure stands of aspen, and aspen in association with various conifers such as Engelmann spruce *(Picea engelmannii)*, lodgepole pine, ponderosa pine, and douglas-fir. Aspen-dominated cover types occupy approximately 1 percent of the planning area's BLM-administered lands. Aspen cover types can be climax or seral to conifer cover types (e.g., Douglas-fir). Aspen/Conifer cover types are found between 5,500 feet and 8,000 feet on a variety of soils but grow best in deep, moist, loamy soils in a range of precipitation zones (16-inch to 40-inch precipitation zones).

Although conifer invasion is a natural pattern in many aspen stands, long-term fire suppression throughout the planning area has resulted in an increased representation and dominance by conifer in aspen stands, thus reducing the extent of aspen-dominated stands, increasing fire hazard, and impacting visual resources.

Fire Ecology

Most Dry Conifer species have thick bark that protects them from serious damage during ground fires, except for young limber pine trees, which often die in low-severity fires. Ponderosa pine is very resistant to ground fire; Douglas-fir is less resistant to ground fire. In Douglas-fir stands on steep slopes, wildland fires tend to become lethal crown fires. Fuel loads in douglas-fir and ponderosa pine average approximately 17 tons/ac. Aspen/Conifer and Dry Conifer are both classified as Fire Regime III (Hardy et al. 2001). Fire frequencies in the Aspen/Conifer mix range between 25 years and 100 years (63 years midrange) with mixed severity (Loop and Gruell 1973). Fuel loads range from above 6 tons/ac. Pure stands of aspen are particularly susceptible to mortality of above-ground stems from fire, but aspen is well-adapted to regeneration by sprouting following fire (Jones and DeByle 1985; Mutch 1970). Specific site and climatic conditions are necessary before fires can ignite and spread, as aspen stands do not easily burn and often act as natural fuel breaks during wildland fires. Fires generally do not occur in young aspen stands. In older stands, during the warmest/driest months of the year, abundant fuel can lead to higher severity fires. Late-seral stage aspen stands in areas with thin, acidic soils may be less vigorous at regenerating via suckering. Sites such as these may support conifers even after fire (USDA 2002f). Typical fire regimes for FRCC in Aspen/Conifer is given below in Table 3-11.

Current condition of the Aspen/Dry Conifer cover types is given in Table 3-12 for each of the field offices. Current condition (percentage) is analyzed by proportions of age class (roughly equivalent to seral stage) and, when present, uncharacteristic vegetation. Current FRCC, a landscape-level risk descriptor, is also given for each field office.

TABLE 3-11. TYPICAL FIRE REGIMES FOR FIRE REGIME CONDITION CLASS (FRCC) 1, 2, AND 3, FOR ASPEN/CONIFER AND DRY CONIFER

	FRCC 1	FRCC 2	FRCC 3
Natural Fire Rotation	25-100 years	100+ years	100+ years
Fire Severity	Mixed: Mostly ground fires with some stand-replacing fires	Mixed: Ground fires and stand-replacing fires	Mostly stand-replacing fires
Fire Size and Pattern	Small to moderate fires likely; burning in a mosaic pattern	Moderate to large fires likely; burning in less of a mosaic pattern and more of a contiguous pattern	Large landscape-scale fires likely, mostly contiguous burn patterns
This cover type requires more disturbances for its recovery and maintenance than what has occurred in the past 30 years.			

TABLE 3-12. CURRENT CONDITIONS (%) OF ASPEN/CONIFER AND DRY CONIFER BY AGE CLASS AND CURRENT FIRE REGIME CONDITION CLASS (FRCC), BY FIELD OFFICE

Vegetation Cover Type and Age Class	Field Offices							
	USFO		PFO		BFO		SFO	
	Condition	FRCC	Condition	FRCC	Condition	FRCC	Condition	FRCC
Aspen: <30-y	<1%		2%		<1%		2%	
Aspen/Conifer: 30-50-y	30%	3	29%	3	30%	3	29%	3
Dry Conifer: >50-y	70%		69%		70%		69%	

- FRCC 1: Results in a 40:40:20 mixture of successional stages arranged in a mosaic pattern across the landscape. The basis for the mixture is described by the DFC development explanation in Appendix C. Of the forested landscape, 40 percent can be characterized as having approximately 30 to 40 mature conifer trees and 1,000 to 10,000 aspen stems per acre. Small pockets of conifer regeneration are present, and aspen regeneration is vigorous. Understory vegetation includes a variety of native shrubs, forbs, and grasses. Forest stands have low susceptibility to insect attack and disease, making standing dead and down trees scarce.
- FRCC 2: Results in more mid and late successional forest than early successional forest across the landscape. More than half of the forested landscape can be characterized as having approximately 40 to 80 mature conifer trees per acre with many Dry Conifer seedlings and/or shade-tolerant tree species present in the understory. Aspen stands have

become smaller and are slowly being replaced by conifers. Aspen stand density may range from approximately 10 to 1,000 stems per acre with little to no regeneration occurring. Understory native species richness is diminished. Forest stands are moderately susceptible to insect attack and disease and have scattered pockets of standing dead and down trees.

- FRCC 3: Results in a landscape predominately made up of late successional forest. The majority of the forested landscape can be characterized as having 80 to more than 800 conifer trees per acre with little to no understory. Aspen stands have become a minor component with approximately 0 to 10 stems per acre and little to no regeneration occurring. Forest stands are highly susceptible to insect attack and disease and have a high density of standing dead and down trees.

3.2.1.5 Salt Desert Shrub

Salt Desert Shrub is one of the least extensive cover types in the planning area, occupying less than 1 percent of the planning area's BLM-administered lands. Halophytes and succulent shrubs, which are saline-tolerant, characterize Salt Desert Shrub, including four-wing saltbush *(Atriplex canescens)*, shadscale *(Atriplex confertifolia)*, winterfat *(Eurotia lanata)*, bud sage *(Atriplex spinescens)*, and greasewood *(Sarcobatus vermiculatus)*. Common grasses include saltgrass *(Distichlis spicata)*, alkali sacaton (*Sporobolus airoides)*, Indian ricegrass *(Oryzopsis hymenoides)*, and squirreltail *(Sitanion hystrix)*. Productivity in this cover type is relatively low, as understory vegetation is naturally sparse and fuels are generally light. Greasewood favors deeper soils with an accessible water table, and high pH and alkaline content. Biological crusts are usually present and cover most of the interspaces between shrubs in Salt Desert Shrub cover types.

<u>Fire Ecology</u>

Fire frequency has been estimated at 200 to more than 300 years for the Salt Desert Shrub cover types. Fuel loads vary between 250 lb/ac to 750 lb/ac. Historically, fire was not a common disturbance in Salt Desert Shrub. A lack of continuous cover (fuels) made fire rare to non-existent in shadscale cover types. Historically, Salt Desert Shrub cover types did not burn often enough or in large enough patches to support dominance of fire-adapted plants. At present, cheatgrass has invaded some Salt Desert Shrub. Salt Desert Shrub is classified as Fire Regime V (Hardy et al. 2001). Typical fire regimes for FRCC in Salt Desert Shrub is given in Table 3-13.

Current condition of the Salt Desert Shrub cover type is given in Table 3-14 for each of the field offices. Current condition (percentage) is analyzed by proportions of age class (roughly equivalent to seral stage) and, when present, uncharacteristic vegetation. Current FRCC, a landscape-level risk descriptor, is also given for each field office.

FRCC 1 through FRCC 3: At present, there is little data to predict the relationship between vegetation structure and composition and successional stages or FRCCs in Salt Desert Shrub.

TABLE 3-13. TYPICAL FIRE REGIMES FOR FIRE REGIME CONDITION CLASS (FRCC) 1, 2, AND 3 FOR SALT DESERT SHRUB

	FRCC 1	FRCC 2	FRCC 3
Natural Fire Rotation	> 200 years	Unknown	Unknown
Fire Severity	Low-medium: Mixed severity with some stand replacement depending on conditions and fire weather	Medium-high: Mixed with a greater proportion of stand replacement	High: Stand replacement from recurrent burning of the increasingly dominant cheatgrass component
Fire Size and Pattern	Small to moderate burning in a mosaic pattern	Moderate to large with little to no mosaic patterns	Large and contiguous
To maintain this cover type, fewer disturbances than what has occurred in the past 30 years are required.			

TABLE 3-14. CURRENT CONDITIONS (%) OF SALT DESERT SHRUB BY AGE CLASS AND CURRENT FIRE REGIME CONDITION CLASS (FRCC), BY FIELD OFFICE

Vegetation Cover Type and Age Class	Field Offices							
	USFO		PFO		BFO		SFO	
	Condition	FRCC	Condition	FRCC	Condition	FRCC	Condition	FRCC
Perennial Grass; <30-y	<1%	1	4%	1	11%	1	NA	NA
Shrub/Grass/Bare Ground Mix >30-y	86%		82%		75%			
Cheatgrass/Weeds	14%		14%		14%			
NA = not applicable; there is less than 100 acres of Salt Desert Shrub mapped in the SFO								

3.2.1.6 Vegetated Rock/Lava

Vegetated rock/lava, which comprises approximately 11 percent of the planning area's BLM-administered lands, is characterized by limber pine *(Pinus flexilis)*, Rocky Mountain juniper (*Juniperus scopulorum*), Wyoming big sagebrush, fernbush, and a variety of forbs. Trees occur in different densities depending upon substrate, either as isolated trees growing in the cracks and fissures of lava flows, forming open woodlands with low cover, or as stands growing in cinder deposits, forming higher densities and cover. Most pre-settlement trees on vegetated lava has been harvested in the past 150 years (National Park Service [NPS] 2003).

Fire Ecology

Historically, natural fire was infrequent and noncontiguous in open vegetated lava woodlands, where only one to a few trees burned; whereas, natural fire was infrequent but contiguous in the denser stands and could result in stand replacement. Due to the broken terrain of Vegetated Rock/Lava, secondary succession following wildland fire is highly unpredictable and depends on specific microsite characteristics like the amount of soil deposition and soil development, seed sources, and dispersal from surrounding areas. Consequently, the development of vegetation following fire is quite varied. In addition to limber pine and Rocky Mountain juniper, Vegetated Rock/Lava cover types may be composed of varying amounts of herbaceous forbs, grasses, and shrubs (e.g., Wyoming and mountain big sagebrush, fernbush, bitterbrush, syringa, currant, and chokecherry). Vegetated rock/lava is classified as Fire Regime V (Hardy et al. 2001). Typical fire regimes for FRCC in Vegetated Rock/Lava is given below in Table 3-15.

Current condition of the Vegetated Rock/Lava cover type is given in Table 3-16 for each of the field offices. Current condition (percentage) is analyzed by proportions of age class (roughly equivalent to seral stage) and, when present, uncharacteristic vegetation. Current FRCC, a landscape-level risk descriptor, is also given for each field office.

Table 3-15. Typical Fire Regimes for Fire Regime Condition Class (FRCC) 1, 2, and 3 for Vegetated Rock/Lava

<table>
<tr><th></th><th>FRCC 1</th><th>FRCC 2</th><th>FRCC 3</th></tr>
<tr><td>Natural Fire Rotation</td><td>200 to 300+ years</td><td>15-60 years</td><td><10 years</td></tr>
<tr><td>Fire Severity</td><td>Low severity in open woodland where fuels are light, sparse, and discontinuous.
Mixed to high severity in denser stands on cinder deposits with the potential of stand replacement depending on conditions and fire weather.</td><td rowspan="2">Secondary succession following wildland fire is highly unpredictable and depends on microsite-specific characteristics like amount of soil deposition and soil development, seed sources and dispersal from surrounding areas, etc.
Consequently, cover types on lava are quite varied and may be composed of varying amounts of herbaceous forbs and grasses, shrubs as well as Utah and Rocky Mountain junipers and limber pine.</td><td rowspan="2">See FRCC 2.</td></tr>
<tr><td>Fire Size and Pattern</td><td>Open Woodland: Small and patchy, often only one or two trees burn, ignition typically from lightening strikes.
Denser Stands: Small to large and contiguous.</td></tr>
<tr><td colspan="4">This cover type has been little affected by disturbances over the past 30 years.</td></tr>
</table>

FRCC 1 through FRCC 3: At this time, there is little data from which to predict the relationship between vegetation structure and composition with successional stages or FRCCs on Vegetated Rock/Lava (see Table 3-16).

TABLE 3-16. CURRENT CONDITIONS (%) OF VEGETATED ROCK/LAVA BY AGE CLASS AND CURRENT FIRE REGIME CONDITION CLASS (FRCC), BY FIELD OFFICE

Vegetation Cover Type and Age Class	Field Offices							
	USFO		PFO		BFO		SFO	
	Condition	FRCC	Condition	FRCC	Condition	FRCC	Condition	FRCC
Perennial Grass	11%	1	7%	1	2%	1	3%	1
Rock/Shrub/Grass/ Tree mix	75%		79%		84%		83%	
Cheatgrass/Weeds	14%		14%		14%		14%	

3.2.1.7 Wet/Cold Conifer

Wet/Cold Conifer occupies approximately 0.5 percent of the planning area's BLM-administered lands. Wet/Cold Conifer occurs at high elevations in the colder, humid environment above the Douglas-fir cover types. In the planning area, Wet/Cold Conifer is mainly dominated by lodgepole pine *(Pinus contorta)*. Other localized dominants include Engelmann spruce and subalpine fir *(Abies lasiocarpa)*. At lower and mid-elevation sites, subalpine fir occupies sites that are too wet, too dry, or too low in nutrients for Engelmann spruce. At higher elevations, it is not uncommon to find pure stands of Engelmann spruce. The spruce-fir cover type occurs above 7,000 feet on shallow soils in 30-inch to 40-inch precipitation zones. The lodgepole cover types occur above 6,000 feet on a variety of soils in 15-inch to 30-inch precipitation zones. Lodgepole is often regarded as early seral for spruce-fir and Douglas-fir cover types.

Fire Ecology

Stand replacing fire frequencies for the spruce-fir cover types range from 50 years to 300 years (Agee 1993; Arno 1980; Romme 1979). Fuel loads depend largely upon elevation and aspect. Subalpine fir and Engelmann spruce are very sensitive to wildland fire. Fire severity in these stands varies from low severity, which consumes duff and small diameter fuels, to high severity, which may become stand-replacing fires. Lodgepole pine is sensitive to medium to high severity fires, though fires in lodgepole also include slow moving fires in sparse duff. Lodgepole pine must experience hot crown and stand-replacing fires for its serotinous cones to open. Wet/Cold Conifer is classified as Fire Regime V (Hardy et al. 2001). Typical fire regimes for FRCC in Wet/Cold Conifer is given below in Table 3-17.

Current condition of the Wet/Cold Conifer cover type is given in Table 3-18 for each of the field offices. Current condition (percentage) is analyzed by proportions of age class (roughly equivalent to seral stage) and, when present, uncharacteristic vegetation. Current FRCC, a landscape-level risk descriptor, is also given for each field office.

TABLE 3-17. TYPICAL FIRE REGIMES FOR FIRE REGIME CONDITION CLASS (FRCC) 1, 2, AND 3 FOR WET/COLD CONIFER (CLIMAX LODGEPOLE PINE FOREST)

	FRCC 1	FRCC 2	FRCC 3
Natural Fire Rotation	50 - 300 years	80 - 300 years	150 - 300+ years
Fire Severity	Stand replacement: Some surface fire but mostly stand replacing fire with high intensities.	Stand replacement: Some surface fire but mostly stand replacing fire with high intensities.	Stand replacement: Some surface fire but mostly stand replacing fire with high intensities.
Fire Size and Pattern	Large stand replacement fires in a mosaic or in a continuous pattern under extreme climatic conditions.	Large stand replacement fires in a mosaic or in continuous pattern.	Large stand replacement fires in a mosaic or in continuous pattern.
This cover type requires more disturbances for its maintenance than what has occurred in the past 30 years.			

TABLE 3-18. CURRENT CONDITIONS (%) OF WET/COLD CONIFER BY AGE CLASS AND CURRENT FIRE REGIME CONDITION CLASS (FRCC), BY FIELD OFFICE

Vegetation Cover Type and Age Class	Field Offices							
	USFO		PFO		BFO		SFO	
	Condition	FRCC	Condition	FRCC	Condition	FRCC	Condition	FRCC
Shrub/grass: <30-y	2%		<1%		4%		1%	
Shrub/tree: 30-75-y	10%	2	10%	2	10%	2	10%	2
Tree-dominated: >75-y	88%		90%		86%		89%	

- FRCC 1: Results in a 30:40:30 mixture of successional stages arranged in a mosaic pattern across the landscape. The basis for the mix is described by the DFC development explanation in Appendix C. Of the Wet/Cold Conifer forest, 40 percent can be characterized as having tree densities of 700 stems/acre to 800 stems/acre. Lodgepole pine regeneration occurs in small blow-down areas creating pockets of ladder fuel (i.e., small trees and overlapping deadfall). The majority of the forested landscape is composed of a mosaic of single-age class lodgepole pine stands, which originated at different times following periodic large-scale disturbance (usually fire). Susceptibility to insect attacks, disease, and blowdown is relatively low compared to forested landscapes in FRCC 2 or 3.
- FRCC 2: Results in more mid successional and late successional stages than early successional stages across the landscape. More than one-half of the Wet/Cold Conifer forest can be characterized as having tree densities of 800 stems/acre to 1,000 stems/acre. Insect attacks, disease, and blowdown are more prevalent and as a result, forest canopy openings are more numerous/large. Lodgepole pine regeneration occurs in these openings creating multi-aged stands and moderate amounts of ladder fuel (i.e., small trees and overlapping deadfall).
- FRCC 3: Results in a landscape with the majority of Wet/Cold Conifer forest in a late stage of succession (more than 2,000 stems per acre is not uncommon). Forested

landscapes in this condition are highly susceptible to insect attack, disease, and blowdown, which combined, create large and numerous canopy openings. Seedlings, saplings, and pole-sized lodgepole pine grow up in canopy openings creating mixed aged-class stands and large amounts of ladder fuel (i.e., small trees and overlapping deadfall).

3.2.1.8 Riparian

Riparian and wetland cover types, which occupy less than 1 percent of the planning area, are defined as "areas of land directly influenced by permanent water, which have visible vegetation or physical characteristics reflective of permanent water influence." Lake shores and stream banks are typical riparian areas. Excluded from Riparian are such sites as ephemeral streams or washes that do not support vegetation dependent upon free water in the soil. In the planning area, healthy riparian areas generally can be identified by typical riparian species such as cottonwoods *(Populus* spp.*)*, willows *(Salix* spp.), sedges *(Carex* spp.*)*, and rushes *(Juncus* spp.*)*. Cottonwoods are found in nearly pure stands along the Snake River. These Riparian and wetland cover types support a wide variety of plant species and form important habitat for a large number of fish, birds, and mammals. Dominant riparian and wetland plant species, their ecological functions, responses to fire, and resource management considerations are listed in Appendix E. Unhealthy riparian areas are characterized by sagebrush growing near highly incised surface waters, with juniper invasion along the stream banks.

Fire Ecology

Natural fire is generally an infrequent occurrence in this cover type, though the dominant cover type adjacent to the Riparian cover type usually dictates its natural/historical fire rotation. It is difficult to generalize about the vegetation structure and composition of riparian areas as they relate to successional stages or FRCCs. Improving FRCC in adjacent upland cover types would generally benefit Riparian cover types. Typically, fire regimes for Riparian areas are associated with the FRCC of adjacent vegetation types (Table 3-19).

TABLE 3-19. TYPICAL FIRE REGIMES FOR FIRE REGIME CONDITION CLASS (FRCC) FOR RIPARIAN

Natural Fire Rotation	Fire frequency is closely related to fire occurrence in the surrounding upland cover types.
Fire Severity	Low to high severity depending on fuel moisture and fire weather.
Fire Size and Pattern	Small and discontinuous to large and continuous depending upon fuel moisture and fire weather.

3.2.1.9 Special Status Plants

Special status plants occur in a variety of cover types across the planning area. Ranking categories and protocols for special status plants, and a summary of known taxa on the planning area is presented in Appendix F. Listed taxa are afforded protection under the Endangered Species Act (ESA), as amended, and under BLM regulations. The mandates of the ESA only apply to taxa that have been officially listed as threatened or endangered, are proposed for listing, or are candidates for listing (BLM Manual 6840). The BLM is required to consult with the U.S. Fish and Wildlife Service (USFWS) on potential impacts to listed plants.

BLM sensitive plants are designated by the State Director under 16 U.S. Code (USC) 1536 (a)(2). Sensitive plants shall be managed so as to prevent further listing as proposed, threatened, or endangered, with the same level of protection as candidate species (BLM Manual 6840). In the planning area, 47 special status plant taxa are known to occur. Sixteen additional species have Watch status. The plants, their statuses, the field office of occurrence, and their habitats are also listed in Appendix F.

Little is known about the distribution, size, and trend of special status plant populations within the planning area. Most of the information is limited to habitat and population structure information collected with new species locations. Most monitoring programs are recent; therefore, long-term data regarding the response of these plant taxa to disturbance, including data on the response of these taxa to fire, are rare to nonexistent.

Only one special status plant, Ute ladies' tresses *(Spiranthes diluvialis)*, is protected by its listing as *threatened* under the ESA. This riparian species has a highly limited distribution along the South Fork of the Snake River. Monitoring of the South Fork populations began in 1997, with modifications to the monitoring methods in 2001 (Moseley 1998, 2000; Murphy 2000, 2001a, 2001b).

One species, Saint Anthony evening primrose *(Oenothera psammophila)*, is protected by a conservation strategy that guides management of its sand dune habitat in a manner that provides for the primrose's life history requirements (Idaho State Conservation Effort 1995).

3.2.1.10 Noxious Weeds

In addition to cheatgrass and medusahead wildrye invasions and juniper expansion, the planning area's vegetation resources are also threatened by a variety of noxious weeds listed by the State of Idaho (Appendix G). Species such as *Centaurea diffusa* (diffuse knapweed), *Acroptilon repens* (Russian knapweed), *Centaurea maculosa* (spotted knapweed), thistles, and *Chondrilla juncea* (rush skeletonweed have exhibited a tendency to increase following fires.

While roads and trails are often areas of concentration for noxious weeds, scattered populations occur throughout the planning area in all habitats. A summary of regulations and management direction for noxious weeds is in Appendix G.

Field offices manage noxious weeds through annual inventories and treatments. Weed control treatments may include integrated chemical, biological, mechanical, and/or hand treatment methods, as well as post-fire weed detection and monitoring. Using integrated pest management methods is preferred over chemical treatments alone. Controlling and monitoring noxious weeds, as with any other post-wildland fire rehabilitation treatment, would be funded by other sources beyond two years following fire control.

3.2.1.11 Current Fire Ecology Trends

The primary vegetation/fire ecology-related trends on the planning area include:

1. Low-elevation and Mid-elevation Shrub (sagebrush steppe): The sagebrush steppe has dramatically decreased from its historical extent through conversion to agriculture, seeded ranges, and, more recently, from cheatgrass invasion and associated altered fire regimes. In addition, Mid-elevation Shrub has become invaded by junipers (i.e., encroachment) or is occupied by late-seral stage, single age-class stands of sagebrush. Continued loss of these cover types is a major concern.
2. Perennial and Invasive Annual Grass (potential sagebrush steppe): Areas dominated by these cover types occur principally in what was once sagebrush steppe. Perennial Grass cover types are now composed of seeded ranges and recovering burned areas, primarily the result of range improvements and/or fire rehabilitation. Perennial Grass cover types also include some lower seral stages that historically were less abundant. Invasive Annual Grass cover types are on the increase, dominated by invasive non-native annual species, such as cheatgrass and medusahead wildrye. Expansion of Invasive Annual Grasses into native sites is a major, immediate concern. Site occupancy by introduced perennial placeholder species in disturbed areas is much preferred over invasion by cheatgrass or other noxious weeds. In Perennial and Invasive Annual Grass cover types, current fire regimes have increased in frequency and severity compared to the historical fire regimes typical of intact sagebrush steppe.
3. Forest, Mid-elevation Shrub, Riparian, Mountain and Salt Desert Shrub, and Vegetated Rock/Lava: In general, fire suppression in forests and woodlands have increased stand densities. Dry Conifer and Aspen/Conifer, as well as encroached juniper in Mid-elevation Shrub, have shifted the seral balance toward greater representation of climax vegetation, with a corresponding loss of early and intermediate seral stages. Wildlife habitat quality has declined, while acreage of late-seral stage stands and the attendant fuel loads have increased. In Dry Conifer, Aspen/Conifer, and juniper encroachment, current fire regimes are less frequent than historical fire regimes. In Mountain Shrub, Salt Desert Shrub, Wet/Cold Conifer, Riparian, and Vegetated Rock/Lava, current fire regimes remain about the same as historical fire regimes.

3.2.2 Risks

At present, decreases in native species, invasion of weeds, expansion of undesirable species, and alteration of natural fire regimes have impoverished cover type structural diversity and ecosystem integrity in the planning area. The situation is characterized by the limited occurrence of healthy sagebrush steppe, disproportionate dominance by late seral forest cover stages, and the associated loss or impairment of a variety of linkages and corridors between wildlife habitats. Specific risks associated with each cover type are briefly discussed below.

3.2.2.1 Low-elevation Shrub, Perennial Grass, Invasive Annual Grass

The main risk is the further expansion of cheatgrass, through altered fire regimes and loss of remaining Low-elevation Shrub, especially Wyoming big sagebrush. Wyoming and basin big sagebrush cover types are the most at risk and least resilient vegetation resources on the planning area, especially on the west side. Altering cover type structure via increased three-tip sagebrush dominance may reduce habitat value for a variety of sagebrush-obligate wildlife species, including sage grouse.

The main risk in Perennial Grass cover types is the further expansion of cheatgrass facilitated by wildland fires and loss of the remaining native Perennial Grass cover types, which occur in mid to late seral sagebrush steppe. Over the long term, seeded grass ranges may become more diverse with the expansion of sagebrush and other native perennials. Site occupancy by introduced perennial placeholder species is much preferred over invasion by cheatgrass or other noxious weeds.

The main risk in Invasive Annual Grass cover types is present and the future expansion of cheatgrass and continued altered fire regimes. Expanding Invasive Annual Grass cover type is a major factor responsible for increased fire frequency and severity in the sagebrush steppe.

3.2.2.2 Mid-elevation Shrub, Juniper, and Juniper Encroachment

Two main fire-related risk scenarios exist in the Mid-elevation Shrub cover type: (1) the further expansion of cheatgrass, leading to altered fire regimes and loss of more sagebrush steppe, and (2) the encroachment of juniper into sagebrush steppe habitat, exacerbated by continued fire suppression in juniper (primarily in the BFO management area).

The main risk in juniper is continued expansion into Mid-elevation Shrub and further loss of sagebrush steppe habitat. As junipers begin to dominate a site, understory plants, including the sagebrush component eventually decline. Once understory ground cover is gone, accelerated erosion and soil loss may further degrade the site. In areas invaded by non-native weeds, care must be taken when implementing juniper control activities. Pinyon pine trees are also at risk from juniper encroachment and stand-replacing crown fires. Fire hazard within pinyon areas would be reduced by mechanical harvest and thinning of juniper trees and other fuels, when necessary. No fire is much preferred over dominance by invasive species or noxious weeds.

3.2.2.3 Mountain Shrub

The main risk is continued loss of seral stage diversity because of past fire suppression activities. These activities have resulted in high fuel loads and/or an increase in mature single-age shrub stands. The Mountain Shrub cover type is predominately made up of species that sprout following top-killing fires, so fires do not pose as great a risk in this cover type as in others.

3.2.2.4 Aspen/Conifer and Dry Conifer

High fuel loads, poor stand age-class diversity, and lack of regeneration are the main risks to this cover type. Currently, most stands are mature/stands, often with extensive Douglas-fir beetle kill.

In the Aspen/Conifer mix, the main risk of continued fire suppression and lack of fire management is the continued decline in aspen regeneration and associated increase in coniferous climax species, such as Douglas-fir.

3.2.2.5 Salt Desert Shrub

Invasion by cheatgrass has the potential to increase fire frequency in the Salt Desert Shrub type. Altered fire regimes may eliminate native plants and convert Salt Desert Shrub to an Invasive Annual Grass cover type.

3.2.2.6 Vegetated Rock/Lava

Although there are no major vegetation/fire-related risks to these resources, noxious weed invasions are a potential risk in all cover types following fire.

3.2.2.7 Wet/Cold Conifer

One fire-related risk for Wet/Cold Conifer is the high fuel loads in lodgepole pine forests, especially near the WUI. Another risk is managing for a balance of lodgepole pine and subalpine fir/Englemann spruce.

3.2.2.8 Riparian

There is an indirect risk involving sedimentation events from burned cover types around riparian zones. A loss of canopy over waterways could also increase the risk of higher water temperatures.

3.2.2.9 Special Status Plants

Probably the greatest threat to the viability of many sensitive status plants is the conversion of native sagebrush steppe habitat due to wildland fire and subsequent disturbance associated with rehabilitation or weed invasion. Sensitive plants in Salt Desert Shrub, Low-elevation Shrub, Mid-elevation Shrub, Juniper and pinyon-juniper habitats are likely at the greatest risk from fire-associated impacts due to potential conversion of these habitats by weedy invasive species post-fire, or rehabilitation activities. While special status plants such as Picabo milkvetch *(Astragalus oniciformis)* have been found in rehabilitated areas, disturbance associated with some seedbed preparation methods (plowing, disking), can be detrimental to populations (Moseley and Popovich 1995). Therefore areas with known or suspected special status plant populations are currently treated so as to minimize potential negative impacts to surviving plants, including reduction of soil surface disturbance and rehabilitation with native species or a native/introduced species mix that mimics the structure of the native cover type.

Special status plants that occur in higher elevation/higher precipitation shrub and riparian cover types (i.e., Ute ladies' tresses) are less likely to be negatively impacted by post-fire activities, as these areas are not normally subject to rehabilitation efforts. Special status plants occurring in woodland or forested habitats could potentially be impacted by thinning, RxFire, or post-fire salvage logging. In all cases, positive or negative impacts would depend on the natural fire ecology of the species. Some species might actually benefit from reducing competition or opening the canopy. However, because we know little about the fire ecology of most special status plants, post-fire or post-treatment monitoring of populations is important to future management efforts.

Special status plants are potentially at risk due to fire suppression activities due to bulldozing fire lines. Resource advisors knowledgeable in the location of T&E and BLM-Sensitive species are important participants in fire suppression activities.

3.2.2.10 Noxious Weeds

In many situations, wildland fires have exacerbated the recent expansion and invasion of weeds such as knapweeds, skeletonweed, and thistles. This is especially true in the western, warm, low-elevation areas dominated by sagebrush steppe and grasslands. Noxious weeds may affect the environment by altering soil properties, depleting soil nutrients, altering the composition of native cover types, altering movement and use by animals, and by altering the historical disturbance cycles, including fire and grazing (BLM 1991). From a watershed perspective, heavy infestations of weeds can alter seasonal water flows, reduce infiltration, and increase runoff. Noxious weeds can detract from recreation sites and lower property values, and they can increase the costs and lower the returns of commercial operations. In general, noxious weed invasions are a potential risk in all cover types following fire.

3.2.3 OPPORTUNITIES

Fire is a necessary ecological process in maintaining ecosystem resiliency in natural cover types. Historically, fire was a periodic disturbance that helped maintain a mosaic of cover types and different seral stages while periodically reducing fuel loads. Currently, however, most fire regimes have been altered, resulting in shifts toward Invasive Annual Grass cover types, loss of desirable sagebrush steppe, encroachment of junipers, and decadence in Mountain Shrub, Aspen/Conifer, and Dry Conifer cover types. However, a variety of fire-related management opportunities are available to more effectively manage wildland fuel loads, maintain and improve the ecological integrity of existing vegetation resources, and hinder the spread of undesirable, non-native species. Opportunities exist to manage range cover types for the preservation and improvement of remaining sagebrush steppe habitat, to rehabilitate and restore cover types, and to hinder the spread of Invasive Annual Grasses associated with altered fire regimes.

To varying degrees, native cover types in the planning area are semi-adapted or maintained by fire. Although some important native plant species such as Wyoming big sagebrush may be adversely affected by fire in the short term, the long-term benefits in terms of maintaining habitat diversity are well established. Even in the short term, most perennial grasses and re-sprouting shrubs may be characterized as stimulated by fire, as they typically exhibit an increase in vigor and seed production post-fire. There are two vegetation cover types where wildland fire use (WFU) may be an important tool: (1) present cover types that are the result of altered fire regimes (too frequent or too infrequent wildland fires), and (2) cover types composed of species that benefit or are stimulated by wildland fire. RxFire and/or WFU may provide opportunities to control cheatgrass, rejuvenate Mountain Shrub, reduce the expansion of juniper encroachment, rejuvenate aspens stands, and stimulate lodgepole pine reproduction.

WFU may provide opportunities to mange Mountain Shrub, Mid-elevation Shrub with juniper encroachment, Dry Conifer, and Aspen/Conifer cover types. Because pre-fire understory composition dictates the subsequent post-fire ecological trajectory, opportunities to preserve and restore intact native understories can improve the quality of vegetation resources on the planning area while helping to reduce the occurrence and impacts of undesired fires. Maintaining and restoring cover types with intact understories of perennial grasses are important aspects of managing fire and fuel loads in the sagebrush steppe. Specific opportunities to use fire in the various cover types are briefly noted below.

3.2.3.1 Low-elevation Shrub

Opportunities to manage wildland fire may include suppression to preserve remaining sagebrush steppe and minimize further expansion of Invasive Annual Grass-dominated areas. WFU and RxFire offer opportunities to regenerate the seral mosaic within intact sagebrush steppe. Management efforts that promote native Perennial Grass and forb understories and intact biological crusts offer opportunities to maintain and enhance cover types that are more resilient to the adverse impacts of fire. Fire may also be an important tool in restoration and rehabilitation efforts to control Invasive Annual Grasses, as discussed below.

3.2.3.2 Perennial Grass

Opportunities to apply WFU are limited due to concerns of further invasion of Invasive Annual Grasses. Restoration efforts, however, may use treatments to increse diversity and shrub cover.

3.2.3.3 Invasive Annual Grass

Opportunities to apply wildland fire are severely limited due to concerns of further expansion of Invasive Annual Grass-dominated areas. Restoring Invasive Annual Grasslands to native cover types or more desirable/stable Perennial Grass cover types may involve using RxFire to remove cheatgrass as an initial stage of treatment.

Because the viable populations of Invasive Annual Grass over-winters in the soil as seeds, controlling seedling emergence and reducing seed production are considered effective methods of controlling cheatgrass and medusahead wildrye. The most effective control measures to date have employed chemical herbicides that are applied as pre-emergent controls or to rapidly growing young plants. Seed production can be impacted by RxFire when it is applied during the brief period between the purple stage and when the seeds are dropped a short time later. A summary of restoration methods used in Invasive Annual Grass cover types in the planning area is presented in Appendix H.

3.2.3.4 Mid-elevation Shrub

RxFire and WFU may be useful to regenerate late seral stages and promote seral mosaics of shrublands with diverse native understories of perennial grasses and forbs. Fire may also be useful to control juniper encroachment of Mid-elevation Shrub. This may involve managing fine fuel loads prior to RxFire to ensure fuels are adequate to kill encroaching juniper.

3.2.3.5 Juniper

Opportunities for fire management in controlling the expansion of juniper into sagebrush steppe may involve WFU and RxFire to reduce juniper dominance on Mid-elevation Shrub sites. RxFire and WFU along with other active restoration approaches such as mechanical removal may help to recover sagebrush steppe habitat that has been encroached by juniper. Fire would not be used for fuels reduction in pinyon stands.

3.2.3.6 Mountain Shrub

RxFire and WFU may be useful to regenerate late seral stages and promote seral mosaics of shrubs with diverse native understories of perennial grasses and forbs.

3.2.3.7 Dry Conifer

RxFire and WFU would help reduce fuel loads and stem densities and increase age-class diversity.

3.2.3.8 Aspen/Conifer

RxFire and WFU may be used to regenerate late seral stands and promote a more diverse seral mosaic of aspen, which is currently skewed toward late mature to decadent stands. Restoring aspen stands would require stand-replacement disturbances such as crown fires or mechanical harvesting.

3.2.3.9 Salt Desert Shrub

No opportunities exist for WFU in this covertype, as fire does not play a historical role in these cover types. Preserving the remaining Salt Desert Shrub areas and minimizing further expansion of Invasive Annual Grass-dominated areas would continue to be a challenge.

3.2.3.10 Vegetated Rock/Lava

Opportunities for WFU are severely limited. Regeneration success, proximity to developed areas, and weed invasions pose challenges to the effective use of fire in these areas.

3.2.3.11 Wet/Cold Conifer

RxFire and WFU would help reduce fuel loads and stem densities, but regeneration of lodgepole pine would probably require stand-replacing fires.

3.2.3.12 Riparian

Most of the riparian species, such as cottonwoods, willows, birch, and alder, are somewhat fire-adapted (i.e., they sprout following fire). RxFire may offer a management approach to maintaining seral diversity (increasing plant regeneration) in these cover types. However, these activities would be most effective if managed specifically for the riparian zone versus being a by-product of fire management in an adjacent cover type. Fire management operations in adjacent cover types typically impose buffer zones around riparian and wetland areas, to protect riparian and wetland areas from disturbance.

3.2.3.13 Special Status Plants

Because little is known about the fire ecology of most special status plants, pre-fire and post-fire or post-treatment monitoring of populations provide an opportunity to gain insights that may be important to future management efforts. All areas proposed for treatment (either proactive fuels treatment/restoration or post-wildland fire/rehabilitation) would be surveyed for special status plants on a project-specific basis.

Areas with known or suspected special status plant populations may be managed to minimize potential negative impacts. Knowledge in the location of T&E and BLM-Sensitive species would play an important role in fire management activities by providing direction on specific actions associated with fire suppression, mechanical fuel removal, chemical treatment, or the use of RxFire.

3.2.3.14 Noxious Weeds

Aggressive burn area rehabilitation and restoration through proactive fuels reduction treatments could control the expansion of noxious weeds. Opportunities exist through treatments both post-fire seeding and fuels treatments to prevent further expansion, and as an ongoing program to reclaim areas that are already degraded. Because pre-fire understory composition largely dictates subsequent post-fire ecological trends, preservation and restoration of intact native cover types and biological crusts across the planning area aid in maintaining and enhancing resilient cover types.

Table 3-20 provides a summary of fire management risks and opportunities for each cover type in the planning area.

TABLE 3-20. OVERVIEW OF PRIMARY FIRE MANAGEMENT RISKS AND OPPORTUNITIES, BY VEGETATION COVER TYPE

Cover Type	Characterized By	Fire Risk(s)	Vegetation Management Opportunities
Low-elevation Shrub	Sagebrush steppe: Wyoming big sagebrush, basin big sagebrush, etc.	Further expansion of noxious weeds through altered fire regime and loss of remaining sagebrush steppe, especially Wyoming big sagebrush.	Suppress all wildland fires; Minimize further expansion of Invasive Annual Grass-dominated areas; Preserve remaining sagebrush steppe; Limited fire use (WFU and RxFire) to regenerate mosaic within sagebrush steppe. Further loss of sage grouse habitat is also a major concern, but long-term ecological stability and value suggests the need for seral mosaics even in sagebrush cover types.
Invasive Annual Grass	Principally cheatgrass and medusahead wildrye. Potentially sagebrush steppe.	Further expansion of noxious weeds through altered fire regime.	Use AMR to reduce fire size in areas at risk of Invasive Annual Grass; Restore to more stable vegetation, ideally sagebrush steppe cover type;

TABLE 3-20. OVERVIEW OF PRIMARY FIRE MANAGEMENT RISKS AND OPPORTUNITIES, BY VEGETATION COVER TYPE

Cover Type	Characterized By	Fire Risk(s)	Vegetation Management Opportunities
Invasive Annual Grass, *continued*			Minimize further expansion of Invasive Annual Grass-dominated areas; and rehabilitate or restore Invasive Annual Grasslands to sagebrush/Perennial Grass/forb cover types using available native plant materials and non-native perennial species as necessary. Restoration may involve use of RxFire to remove cheatgrass as an initial stage of treatment. Both approaches are intensive and may be limited by availability of native seed.
Perennial Grass	Seeded areas (native and non-native) and native grasslands (bluebunch wheatgrass, needlegrass, Idaho fescue, etc.). Most perennial grasslands are potential sagebrush steppe.	Further expansion of noxious weeds through altered fire regime and loss of remaining native perennial grasslands that are probably early seral to sagebrush communities.	Use AMR to protect seedings and to allow for shrub establishment; Minimize further expansion of Invasive Annual Grass-dominated areas; and Preserve existing Perennial Grass.
Mid-elevation Shrub	Sagebrush steppe: Mountain big sagebrush, low sagebrush, bitterbrush, etc.	Further expansion of noxious weeds through altered fire regime and loss of remaining sagebrush steppe. Encroachment of Juniper into sagebrush steppe habitat due to past fire suppression.	Use RxFire and WFU to regenerate late seral stages, promote seral mosaics of shrubs and diverse native understories of perennial grasses and forbs. When suppressing fires, use AMR to ensure openings are created where needed.
Juniper	Rocky Mountain juniper, Utah juniper and/or single leaf pine.	Further expansion of noxious weeds through altered fire regime. Expansion of juniper into sagebrush cover types, loss of sagebrush acreage, soil erosion loss from mature stands of juniper. Invasion/expansion of noxious weeds due to loss of native perennial understory and nitrogen inputs into the soil following fire (either RxFire or WFU).	Use vegetation treatments, including RxFire and WFU to remove encroaching juniper.
Dry Conifer	Douglas-fir, limber pine, Ponderosa pine, etc.	Further expansion of noxious weeds through altered fire regime. High fuel loads, poor stand age-class diversity and	Reduce fuel loads and stem densities through mechanical thinning, RxFire and WFU.

TABLE 3-20. OVERVIEW OF PRIMARY FIRE MANAGEMENT RISKS AND OPPORTUNITIES, BY VEGETATION COVER TYPE

Cover Type	Characterized By	Fire Risk(s)	Vegetation Management Opportunities
Dry Conifer, *continued*		lack of regeneration. Currently these areas are skewed toward late mature stands, often with lots of beetle kill in Douglas-fir.	
Aspen/ Conifer	Includes healthy stands of aspen and stands of aspen and invading Conifer.	Further expansion of noxious weeds through altered fire regime. Loss of aspen cover and shift toward greater representation by later seres.	Use RxFire and WFU to regenerate late seral stands and promote more diverse seral mosaic of aspen (e.g., currently skewed toward late mature). When suppressing fires, use AMR to ensure openings are created where needed.
Mountain Shrub	Serviceberry, Ceanothus, snowberry, mountain mahogany, bigtooth maple, chokecherry, antelope bitterbrush, etc.	Further expansion of noxious weeds through altered fire regime. Loss of seral diversity because of past fire suppression activities.	Use RxFire and WFU to regenerate late seral stages, promote seral mosaics of shrubs and diverse native understories of perennial grasses and forbs. When suppressing fires, use AMR to ensure openings are created where needed.
Wet/Cold Conifer	Subalpine fir, Engelmann spruce, lodgepole pine, etc.	Further expansion of noxious weeds through altered fire regime. Concern with lack of regeneration in lodgepole pine due to fire suppression.	No specific management recommendations provided. Regeneration of conifers would occur naturally as stand-replacing fire occurs.
Riparian	Streamside and wetland areas of cottonwood, willow, etc.	Further expansion of noxious weeds through altered fire regime. Mostly a low priority as Riparian is generally excluded from burns under the alternatives, although some RxFire are planned for the west side of the planning area. The same ecological benefits of seral mosaics apply.	Most of the species such as cottonwoods, willows, birch, and alder are somewhat fire-adapted. Fire may offer a management approach to maintaining seral diversity in these communities, especially if they are already impacted by damming and reduced flood flows.
Salt Desert Shrub	*Atriplex* spp. (four-wing, shadscale), spiny hopsage, winterfat, greasewood, etc.	Noxious weeds altering the fire regime in an otherwise non-fire regulated cover type.	Suppress all wildland fires; Minimize further expansion and restore Invasive Annual Grass-dominated areas, and Preserve remaining Salt Desert Shrub areas.
Vegetated Rock/Lava	Agriculture, towns/communities, open water, lava, sand dunes, barren areas, etc.	Non-issue from vegetation standpoint.	Use AMR and WFU as fires occur naturally very infrequently and vegetation is sparse.

3.3 WILDLAND URBAN INTERFACE (WUI)

3.3.1 CURRENT CONDITIONS AND TRENDS

In recent years, public and private lands have continued to burn, resulting in the loss of property, damage to natural resources, and the disruption of community services. Many of these fires burned in the WUI areas and exceeded the fire suppression capabilities of fire-fighters. The WUI can be described as a line, area, or zone in which human developments, such as communities, farms, ranches, summer homes, and recreational facilities, meet or intermix with undeveloped wildland or vegetative fuels on forestland or rangeland (Laverty and Williams 2000).

The planning area has a high potential for damage by wildland fires along the WUI. The BLM and fire districts promote local involvement in wildland fire concerns though approximately 63 mutual aid agreements with various counties.

3.3.1.1 The National Fire Plan

In 1995, a review of existing Federal Wildland Fire Management Policy was initiated after 34 fire-fighter fatalities occurred during the 1994 fire season. The resulting Federal Wildland Fire Management Policy and Program Review was the first comprehensive statement of wildland fire policy coordinated between the U.S. Department of Interior (USDI) and U.S. Department of Agriculture (USDA). It articulated direction on issues of safety, the role of fire in natural resource management, and the relative role of federal and non-federal agencies in the WUI. In January 2001, the Federal Wildland Fire Management Policy was reviewed and updated with a strengthened focus on key issues such as restoring landscapes and rebuilding communities, undertaking projects to reduce risk, working directly with communities, and establishing accountability. Collectively, these documents are known as the National Fire Plan.

In 2000, Congress directed the USDI and USDA to engage the governors of the western states in a collaborative attempt to cooperatively develop a coordinated, national, 10-year comprehensive strategy, with the states as full partners in the planning, decision-making, and implementing the National Fire Plan. *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment – A 10-year Comprehensive Strategy* was officially released in August 2001 and emphasizes a proactive, collaborative, and community-based approach to reducing wildland fires.

3.3.1.2 Communities-at-risk

See Appendix I for a list of communities-at-risk that are located in the planning area. The Secretaries of the USDA and the USDI were asked in the Fiscal Year (FY) 2001 Interior Appropriations Act (Public Law 106-291) to publish jointly in the *Federal Register* a list of all WUI communities that are at high risk from wildland fire (Volume 66, August 17, 2001). The criteria for listing varied from state to state, which explains why some states listed hundreds of communities, while others submitted a much smaller list.

A list of the approximately 158 communities-at-risk located within the planning area (Figure 3-2) is in Appendix I. The list was submitted by the IDL. After IDL identified Idaho's CAR, an interagency team of the USDA, USDI, state foresters, and Shoshone-Bannock Tribal Governments were convened to organize together to reduce the risk to these communities and implement the NFP in a coordinated fashion. Representatives from other federal agencies such as the U.S. Department of Energy (DOE) and U.S. Department of Defense (DOD) were included when appropriate. This team would continue to serve the long-term goals of identifying, prioritizing, and implementing wildland risk and hazard assessment and fuels treatment projects, to ensure that the long-term needs of communities vulnerable to wildland fire are addressed and the NFP is implemented in Idaho.

Additionally, in December 2002, fire and resource personnel created a list of communities/areas that are at highest risk from wildland fire in the planning area (Appendix J). This list was based on BLM's professional judgment regarding which communities/adjacent subdivisions have the highest risk from wildland fire originating on BLM-administered lands. The criteria used to develop the BLM list included proximity to BLM-administered lands (federal fire personnel normally respond to private land fires burning within a 1-mile radius of BLM-administered land), fuel type, and/or continuity such that the potential for large wildland fire exists.

Existing project proposals in those identified WUI communities that have approved plans and completed environmental compliance would have the highest priority for fuels treatment, and work is already underway in many of these communities. Additional projects that can be readied for implementation would receive the next priority. Finally, for those newly identified projects or projects not ready for implementation, the planning process would be initiated toward future treatments, and implementation schedules would be developed.

Additionally, the NFP working group directed all counties in Idaho to prepare mitigation plans. All 44 counties have plans completed. Work is continuing in the vicinity of specific communities (over 30) as outlined in county wildfire protection plans (CWPPs).

3.3.2 RISKS

Seasonal wildland fires present a potential threat to both new and established communities along the WUI. For areas in and around the WUI where wildland fire occurrence is on the increase and there have been no fuels reductions efforts, the risk of large wildland fire is elevated, due to the hazardous fuel loads and associated increases in fire severity, size, and frequency. To reduce fuel loads within the WUI, various kinds of treatment may be used to reduce the risk. Among these, WFU and RxFire pose an inherent risk to WUI areas due to the possibility of escape. Accordingly, WFU and RxFire use is strictly prescribed, requiring site-specific National Environmental Protection Act (NEPA) analysis before implementation.

Several vegetation cover types evolved with fire and require fire to establish, promote, and/or maintain certain cover types found within the ecosystem. Vegetation types may be inherently prone to large scale stand replacement wildland fires that are part of their reproductive process (e.g., stand-replacing fire in lodgepole pine forest stimulate seed drop and reproduction). Where these cover types overlap with WUI, the primary objective would be to reduce wildland fire intensity through the use of mechanical and/or chemical treatments and some RxFire, mostly as pile burning, where appropriate.

During the wildland fire season, the availability of fire-fighting personnel is often diminished depending on the occurrence of other fires in the region, the size of those fires, and the number of structures needing protection. Even for the individual fire, there are not always enough fire-fighters to quickly suppress fires before structures are threatened or damaged by fire. While fire-fighters are defending one structure, the perimeter of the fire may rage on elsewhere, threatening many more structures and consuming many acres of vegetation. For these reasons, residents of communities along the WUI cannot solely depend on fire-fighters to save their property. Residents in the WUI can help protect their property and community by taking defensive steps toward reducing fuel loads both before and during the fire season.

3.3.3 Opportunities

The President of the United States has directed the Secretaries of the USDA and USDI to increase federal investments in projects designed to reduce risk of wildland fire in the WUI. Congress has supported this direction in the form of increased funding since October 2000. The BLM can reduce wildland fire intensity in and around WUI areas by planning and implementing fuels reduction and restoration treatments on surrounding BLM-administered lands.

The 10-year Comprehensive Strategy establishes a strategy for federal, state, and private land managers/owners to plan and prioritize fuels reduction projects in and around WUI areas, improve fire prevention and suppression, restore fire-adapted ecosystems, and promote community assistance. The BLM is participating in interagency awareness campaigns, to encourage private landowners to proactively reduce the risk of wildland fire to their property and improve their safety in relation to wildland fire, as well as prevention programs. By taking defensive steps to assist the BLM and fire-fighters both before and during the fire season, the impacts caused to or from private property can be lessened or possibly even eliminated. Ultimately, however, landowners are responsible for activities that occur on their land, in terms of reducing the potential for wildland fire burning to or from their property.

The BLM also has Memorandas of Understanding (MOUs) with over 41 municipal, county, and fire districts in the planning area. These agreements provide mutual fire-fighting aid between local and county fire departments and the BLM. To ensure that the MOUs are used with the best efficiency, operating plans are updated and maintained on an annual basis by the local and county fire departments. These annual plans are more specific information to help fire managers use time, manpower, and resources to effectively protect communities-at-risk and fight wildland fires.

3.4 SAGEBRUSH STEPPE ECOSYSTEM (ISSUE 2)

3.4.1 Current Conditions and Trends

The historical extent and distribution of the sagebrush steppe ecosystem across southern Idaho has dramatically decreased over the last century from conversion of these lands to agriculture and seeded ranges, cheatgrass invasion, and altered fire regimes. For the purposes of this EIS, present and potential sagebrush steppe cover types are represented by the following cover types: Low-elevation Shrub and Mid-elevation Shrub, Annual and Perennial Grass, and Juniper that has invaded Mid-elevation Shrub sites.

At present, the distribution of shrub dominated acres within the Low- and Mid-elevation Shrub cover types in the planning area are greatly reduced from historical. Those sagebrush steppe cover types that remain are fragmented and have been invaded by cheatgrass; the presence of cheatgrass makes the remaining sagebrush steppe habitats susceptible to large wildland fires.

Continued loss of shrub dominated acres is causing some decline in most of the sagebrush-obligate wildlife species that compose the Sagebrush Guild. The Sagebrush Guild species that use sagebrush steppe habitat are characteristic of the sagebrush steppe ecosystem and require this habitat to reproduce and maintain their populations. Representative Sagebrush Guild species in the bulleted list below depend highly upon sagebrush and its various subspecies - Wyoming and basin big sagebrush and Mountain big sagebrush.

- Greater sage grouse (*Centrocercus urophasianus*)
- Sage sparrow *(Amphispiza belli)*
- Sagebrush lizard *(Sceloporus graciosus)*
- Short-horned lizard *(Phrynosoma douglasii hernandesi)*
- Pronghorn (*Antilocarpa americana*)
- Pygmy rabbit *(Brachylagus idahoensis)*

Wyoming and basin big sagebrush principally occur in the Low-elevation Shrub and Mid-elevation Shrub. Mountain big sagebrush occurs in the transition zone between the Mid-elevation and Mountain Shrub cover types. Shrub cover types provide nesting and rearing cover, fawning cover, thermal cover, refuge (hiding), and winter forage for these wildlife species. The greater sage grouse is the premier representative wildlife species for the sagebrush steppe ecosystem. In the following discussion, reference to sage grouse is used to represent the entire Sagebrush Guild.

Perennial Grass and Invasive Annual Grass cover types presently occur in historical sagebrush steppe. Perennial Grass cover types include seeded ranges or recovering burned areas, while Invasive Annual Grass cover types are highly degraded areas dominated by the invasive annual cheatgrass. Grass cover types do not provide resources that the Sagebrush Guild require; although, they may locally use these cover types when they occur adjacent to intact Low-elevation Shrub and Mid-elevation Shrub. Juniper encroachment into Mid-elevation Shrub sites has also reduced the habitat available to the Sagebrush Guild.

The BLM uses six categories to classify sage grouse habitats: Stronghold Habitat and Isolated Habitat (collectively called Source Habitat), Key Habitat, Restoration 1 Habitat (R1), Restoration 2 Habitat (R2), and Restoration 3 Habitat (R3). Figure 3-3 depicts the distribution of sage grouse habitats across the planning area. Table 3-21 lists the acres of each sage grouse habitat type within the planning area by ownership or administration authority. The INL is included in Table 3-21 because it contains field areas within its boundaries that compose the important, relatively pristine Sagebrush Steppe Ecosystem Reserve (SSER), which is contiguous with adjacent BLM-administered lands.

TABLE 3-21. ACRES OF EACH CATEGORY OF SAGE GROUSE HABITAT WITHIN THE PLANNING AREA, BY LAND JURISDICTION			
	Planning Area Total (Federal, State, and Private)	**Planning Area BLM**	**Planning Area INL**
Stronghold Habitat[1]	2,664,537	1,524,505	26,789
Isolated Habitat	377,198	90,998	NA
Key Habitat	4,396,836	2,210,085	363,471
Restoration 1	1,904,429	1,240,789	140,796
Restoration 2	581,907	458,286	NA
Restoration 3	88,048	73,054	NA
[1]Stronghold and isolated habitats were originally defined as source habitat but the definition was refined in 2004.			

Source Habitats, with various levels of sagebrush canopy cover, herbaceous grass species, and the preferred mixture of forb species, provide high-quality habitats for all members of the Sagebrush Guild, including invertebrates.

Stronghold Habitat is defined as an area in which sufficient Breeding Habitat remains to support sage grouse nesting populations with generally stable or increasing trends since the drought in the 1990s.

Isolated Habitat is defined as an area in which Breeding Habitat remains but is relatively small and isolated by farmlands, forests, and/or grasslands (see Table 3-21). Nesting populations in these areas have been stable or decreasing since the drought of the 1990s.

Key Habitat is defined as generally large-scale, intact sagebrush steppe areas that provide sage grouse habitat. Small inclusions of Perennial Grass cover types, either native or introduced, or other habitats (e.g., mountain mahogany) may be present. At present, Key Habitats are critical to the viability of the Sagebrush Guild in the planning area. Key Habitat areas should be protected from large fires and also maintained and improved as needed (see Figure 3-3).

Restoration Habitats are habitats that have the potential to become Key Habitats. They are considered to lack one or more habitat components and are in need of some treatment to restore their functionality as Sagebrush Guild habitat (see Figure 3-3). Successful treatment areas become Key then Source Habitats that provide enhanced habitat quality for the sagebrush steppe wildlife species, allowing reoccupation of degraded habitats that had been Sagebrush Guild habitat.

- Restoration 1 Habitats (R1) are sagebrush-limited areas with acceptable understory conditions in terms of grass species composition that includes native and seeded Perennial Grass rangelands.
- Restoration 2 Habitats (R2) are areas where existing sagebrush cover may or may not be adequate to meet the needs of sage grouse, but understory herbaceous conditions are poor. Undesirable plant species such as cheatgrass, medusahead wildrye, or other non-

native plants are common to dominant. Opportunities exist in R2 for WFU to achieve restoration objectives.

- Restoration 3 Habitats (R3) are areas of juniper encroachment that usually has invaded Mid-elevation Shrub. Opportunities exist in R3 for WFU to achieve restoration objectives.

Further description of Sagebrush Guild species and their ecology is presented in Section 3.5.1.1, Low-elevation Shrub and Mid-elevation Shrub habitats.

3.4.2 RISKS

Over the past three decades, most of the wildland fire activity in the planning area has been in the sagebrush steppe. Wildland fires have helped accelerate the loss of sagebrush cover types and put both the sagebrush steppe ecosystem and the Sagebrush Guild at risk. The increase in wildland fires has been facilitated by the invasion of Invasive Annual Grasses that provide little to no habitat for the Sagebrush Guild but which dry out early in the growing season and exacerbate the flammable fuel situation. Some of the planning area's previous sagebrush steppe acreages have burned four times since 1970 and are today, dominated by Invasive Annual Grasses. Thus, the interplay between Invasive Annual Grasses and wildland fires has been a major factor in the decline of Sagebrush Guild habitat.

Those sagebrush steppe habitats that remain are important to a number of sensitive species, including, sage grouse, pygmy rabbits, and sage sparrows. Limiting factors to game species such as elk and mule deer include burned-over shrub cover types on winter ranges that are replaced by non-beneficial non-native plants. Wildland fires also reduce carrying capacity for pronghorn, which depend directly upon shrubs and herbaceous cover for fawning success. Furthermore, long-term suppression of natural fires in Mid-elevation Shrub has permitted further loss of Sagebrush Guild habitat by juniper encroachment.

Agricultural development, predation, fragmentation of habitat, and loss of sagebrush steppe cover types have resulted in an overall decline in wildlife populations that compose the Sagebrush Guild.

3.4.3 OPPORTUNITIES

Wildland fire is a natural part of the sagebrush steppe ecosystem. Scientists estimate that the historical fire return interval for Wyoming big sagebrush cover types, which predominate over the planning area, varied between 60 years and 110 years between stand-replacing fires. Opportunities exist to reduce wildland fire frequencies and size in existing shrub cover types to more natural fire regimes. In addition, opportunities exist to manipulate the frequency of fires areas that were once sagebrush steppe (i.e., grassland and/or juniper) and restore these areas to healthy sagebrush steppe cover types.

Opportunities exist for improving the quality and areal extent of sage grouse habitat through the use of fire treatments (WFU and RxFire), as well as mechanical, chemical, and seeding treatments. Although there are short-term consequences of these treatments, they could restore a more diverse sagebrush steppe landscape and return fire frequencies and fire severities to more natural regimes with the beneficial result of better, higher quality habitat for the Sagebrush Guild.

Fire and mechanical treatments can produce a mosaic of successional stages across the landscape that creates a more diverse habitat of high quality. Sage grouse, for instance, use different cover types/successional stage habitats during various phases of the year: shrub cover in spring for nesting and rearing, grass and forb areas during the growing season to balance out a nutritional diet, shrublands in winter for thermal cover and foraging, and open grass or barren areas in late winter and spring for lekking and reproduction. Fire and mechanical treatments can also reduce juniper density and restore sage grouse habitat where juniper has invaded and displaced sagebrush cover types.

3.5 WILDLIFE RESOURCES

To facilitate the description of existing wildlife resources at the landscape-level required for this EIS, wildlife species were categorized into guilds associated with the cover types described in Section 3.2, Vegetation Resources and Fire's Natural Role (Issue 1). This allows the impacts analysis to focus on key wildlife species representative of the suites of species that use each cover type. Wildlife species guild members are listed under each cover type in the following discussion.

3.5.1 CURRENT CONDITIONS AND TRENDS

3.5.1.1 Low-elevation Shrub and Mid-elevation Shrub Habitats

The representative guild species for Low-elevation Shrub and Mid-elevation Shrub cover types in the planning area include greater sage grouse, sage sparrow, sagebrush lizard, short-horned lizard, pygmy rabbit, and pronghorn.

Even though greater sage grouse population levels appear to have been increasing throughout the planning area the long-term trend shows an overall decline in the species. Currently, sage grouse counts are well below historical levels. This decline is due to reduced, fragmented, and lost sagebrush steppe habitat.

Sage grouse use traditional winter and summer habitats (Key Habitat; see Figure 3-3) and depend heavily on sagebrush for nesting cover. Sagebrush also provides critical winter thermal cover and 100 percent of sage grouse winter forage. Some nesting occurs near traditionally used strutting grounds (Autenrieth 1981; Wallestad and Pyrah 1974), while migratory populations may nest upward of 15 miles to 20 miles from traditional strutting grounds. Sage grouse broods are highly upon water, insects, and succulent forage during the first nine weeks following hatching. Riparian areas provide an important source for brood rearing habitats and migration corridors (Autenrieth 1981; Call and Maser 1985).

The sage sparrow is a migrant that summers in Idaho and winters in Arizona, New Mexico, and northern Mexico. It is found in sagebrush flats and desert scrub areas. It usually nests in sagebrush and typically feeds on insects and seeds. This species has been in recent decline. This decline is due to reduced, fragmented, and lost sagebrush steppe habitat.

The sagebrush lizard is a common species associated with sagebrush cover types and pinyon-juniper woodland. It is a ground dweller that prefers open ground with low shrubs and rocks where it retreats when threatened. It feeds on insects (Stebbins 1985). This species appears to be still abundant, but data on this species is less available than for the vertebrates discussed above. The sagebrush lizard faces the same risks that other members of the Sagebrush Guild face.

The short-horned lizard occurs in various habitats including everything from sagebrush to spruce/fir. It may be found at elevations up to 11,000 feet. It feeds on insects and snails and is usually found near loose soil that it can burrow in at night. This species' decline is due to reduced, fragmented, and lost sagebrush steppe habitat.

The pygmy rabbit is the smallest of all North American rabbits. It occurs in dense stands of tall sagebrush and is the only rabbit in North America known to dig its own burrow. It is rarely seen more than a few feet from its burrow or dense cover. Topography and soil are very important in choosing a site to dig their burrows. This species has been in decline in the planning area due to reduced and fragmented sagebrush steppe habitat.

Pronghorn make extensive use of the sagebrush steppe (e.g., Low-elevation Shrub and Mid-elevation Shrub, Perennial Grass, and Riparian cover types). Antelope favor healthy sagebrush habitats (Sundstron et al.1973). Sagebrush is used as forage and habitat year-round, but is of greatest importance in winter. Some researchers have found the winter diet of antelope to be comprised of as much as 95 percent to 100 percent big sagebrush (Olsen and Hansen 1977). Most pronghorn populations in the planning area are considered relatively stable, while long-term population levels have been decreasing in some areas due to habitat loss. Pronghorn are primarily found at elevations below 6,000 feet and on slopes of less than 30 percent in the planning area. Seasonal variations in snow distribution and depth influence antelope distribution on crucial winter ranges, while proximity to water influences antelope distribution on spring, summer, and fall ranges (Figure 3-4). Total pronghorn habitat in the planning area and on BLM-administered land are shown in Table 3-22 and Table 3-23, respectively.

TABLE 3-22. BIG GAME SEASONAL HABITAT ACREAGES ON ALL LANDS (I.E., FEDERAL, STATE, AND PRIVATE) WITHIN THE PLANNING AREA

Species	Seasonal Habitat	Total Habitat
Elk	1,894,709	3,386,751
Mule Deer	1,923,458	8,649,608
White-tailed Deer	38,000	38,000
Pronghorn	1,700,834	3,060,393
Bighorn Sheep	20,932	445,948
Moose	182,402	361,654

TABLE 3-23. BIG GAME SEASONAL HABITAT ACREAGES ON BLM-ADMINISTERED LANDS WITHIN THE PLANNING AREA		
Species	**Seasonal Habitat**	**Total Habitat**
Elk	653,234	1,534,267
Mule Deer	1,246,844	2,250,684
White-tailed Deer	11,658	11,658
Pronghorn	1,108,849	2,115,509
Bighorn Sheep	19,718	201,264
Moose	65,716	170,978

3.5.1.2 Perennial Grass Habitat

The representative guild species for the Perennial Grass cover type include Columbian sharp-tailed grouse *(Tympanuchus phasaianellus)*, western meadowlark *(Sturnella neglecta)*, short-eared owl *(Asio flammeus)*, and montane vole *(Microtus montanus).*

Columbian sharp-tailed grouse occupy various habitats including Low-elevation Shrub and Mid-elevation Shrub, Perennial Grass, and Mountain Shrub. All populations are considered to be at least stable, with recent evidence of expansion occurring in south-central Idaho. Occupied habitat varies from sagebrush/grass native habitat to Conservation Reserve Program lands and recent expansion into old crested wheatgrass seedings.

The western meadowlark is found throughout the entire planning area. It is a ground-nesting, short-distance migrant that usually uses grasslands for breeding grounds. Meadowlarks are ground foragers that typically feed on insects; although, they also consume seeds. Nesting typically occurs during the spring and summer. Meadowlark populations are generally stable throughout the planning area; however, habitat risks to these species include conversion of Perennial Grass to Invasive Annual Grass and loss of sagebrush steppe habitat.

The short-eared owl can be found throughout the Northern Hemisphere and South America. It is a permanent resident of south-central Idaho wetlands and deserts and has been impacted by agriculture and urban development. Short-eared owls are common in agricultural areas; although, there appears to be a problem with the using pesticides in the species' wintering habitat in Argentina. Short-eared owl populations are fluctuating but generally stable throughout the West. They do occur in the planning area but are not common.

The montane vole is associated with wet meadows of forested areas as well as dry grasslands and sagebrush grasslands. They live in runways and burrows under the cover of tall grasses. They forage chiefly on grasses, sedges, and rushes. This species may be impacted by agricultural or other developments in its natural habitat. Montane vole populations in the planning area appear to fluctuate somewhat but are generally stable.

3.5.1.3 Invasive Annual Grass Habitat

Representative species that inhabit or use the Invasive Annual Grass cover type in the planning area include the long-billed curlew *(Numenius americanus)* and western burrowing owl *(Athene cunicularia)*.

The long-billed curlew is a neotropical migrant that is found within the administrative boundaries of all of the planning area field offices. This bird typically inhabits grasslands near riparian areas or water sources where it can obtain its preferred food source of aquatic invertebrates. In upland areas, curlew also feed on insects, berries, and seeds. Long-billed curlew populations appear to be declining throughout the western Great Plains but are actually increasing in Idaho.

The western burrowing owl is found in grasslands associated with sagebrush steppe across the planning area. Burrowing owls are neotropical migrants that feed on insects, birds, small mammals, and reptiles. As indicated by their name, they nest in burrows instead of on the ground or in trees; they often use abandoned burrows of badgers, gophers, or foxes. Sometimes breeding pairs live together in colonies. Burrowing owls require open areas with low ground cover for hunting and burrows. Decreases in burrowing owls in the planning area can be attributed to overall decreases in burrowing animals, as well as loss of habitat to agriculture. Burrowing owl populations in the planning area appear stable. However, their population numbers have been shown to fluctuate according to the abundance of prey items such as voles.

3.5.1.4 Juniper and Mountain Shrub Habitats

Wildlife species representative of the Juniper and Mountain Shrub Guilds include ferruginous hawk *(Buteo regalis)*, juniper titmouse *(Baeolophus ridgwayi)*, gray flycatcher *(Empidonax wrightii)*, mule deer *(Odocoileus hemionus)*, California bighorn sheep *(Ovis canadensis)*, and mountain lion *(Felis concolor)*.

The ferruginous hawk, a BLM sensitive species, is the largest of the North American buteos. It is a neotropical migrant that breeds from southwestern Canada to central Arizona, New Mexico, and northern Texas and winters in California to northern Mexico. It is a year-round resident over the region that extends from Nevada through western and southern Idaho, northern Arizona, and New Mexico to eastern Colorado and South Dakota. In the western and southeastern portions of Idaho, the ferruginous hawk nests at the edge of juniper habitats and open, desert and grassland habitats. Ferruginous hawks are highly sensitive to human disturbance (e.g., oil and gas development, agricultural practices, and urban encroachment). They have experienced a decline across much of their range and have been extirpated from some of their former breeding grounds in Idaho. Portions of the Raft River and Curlew Valleys have been designated as a Globally Important Bird Area by the American Bird Conservancy and National Audobon Society for its healthy, well-monitored, and extensively-studied population of ferruginous hawks.

The juniper titmouse is a year-round resident of the pinyon-juniper and pine woodlands; it is also common in suburbs. It nests in snag holes, natural or made by woodpeckers. They typically feed on fruit, seeds, and insects. This species is relatively tolerant of human encroachment.

The gray flycatcher is a migrant species that summers in Utah and Idaho and winters in Mexico. It nests in arid pinyon-juniper woodlands and sagebrush areas. It builds its nest in the crotch of juniper trees or sagebrush. It feeds exclusively on insects. This species is still quite common but faces the same risks that other Sagebrush Guild species face.

Mule deer populations in the planning area are presently considered stable, with current management direction focused on improving or maintaining existing numbers. Preferred areas of seasonal habitat use, including migration routes, are characterized by vegetation mosaics of timbered or tall brush hiding cover, mixed with sagebrush/grass and bitterbrush as well as mountain mahogany foraging sites (Figure 3-6). Preferred hiding and thermal cover include timber stands, willow, aspen, and tall sagebrush. Proximity to water, an important factor during spring, summer, and fall, is the reason for deer dependency upon riparian zones. Aspen stands provide an important required habitat component for fawning and fawn rearing cover. Total mule deer habitat in the planning area and on BLM-administered land are shown in Table 3-22 and Table 3-23, respectively.

The mountain lion is managed as a game species in Idaho. Mountain lions are usually associated with remote, rough topography. However, mountain lions are increasing their occupation of major Riparian habitat, where an abundant prey base of white-tailed deer already exists, especially within the Upper Snake and Pocatello Field Offices. Within the Shoshone Field Office, white-tailed deer are considered to be isolated, scattered and at low densities within the Big Wood River Valley.

Presently, two subspecies of bighorn sheep occupy areas within the planning area. Rocky Mountain bighorn sheep occupy winter habitat areas (i.e., Low-elevation Shrub cover types) within the Lemhi and Birch Creek areas of the USFO, while California bighorn sheep occupy suitable areas of the Jim Sage Mountain range and South Hills area (i.e., Mid-elevation Shrub and Mountain Shrub cover types) of the BFO (Figure 3-5). Bighorn sheep require areas adjacent to extremely steep rough or precipitous terrain for escape and security cover. Shrubby mountain mahogany and open sagebrush-grass sites, interspersed with steep escape cover are typical of foraging and loafing areas. Stands of dense timber and brush are predominantly avoided, except when sheep are forced to move through such areas during migration from summer to winter habitat areas. Bighorn sheep populations in the planning area are small but stable. Recently, bighorn sheep have been transplanted into their historic range along Idaho border with Utah and Nevada. Total bighorn sheep habitats in the planning area and on BLM-administered land are shown in Table 3-22 and Table 3-23, respectively.

3.5.1.5 Dry Conifer, Aspen/Conifer, and Wet/Cold Conifer Habitats

Wildlife species representative of the Wet/Cold Conifer, Dry Conifer, and Aspen/Conifer Guilds include the northern goshawk *(Accipter gentiles)*, three-toed woodpecker *(Picoides tridactylus)*, ruffed grouse *(Bonasa umbellus)* red-naped sapsucker *(Sphyrapicus nuchalis)*, snowshoe hare *(Lepus americanus)*, Rocky Mountain elk *(Cervus elaphus)*, and moose *(Alces alces)*.

Northern goshawks generally occur in undisturbed forested areas. Areas of potentially suitable Nesting Habitat for northern goshawk typically consist of coniferous forest and mixed-aspen forest types dominated by spruce, fir, pine, and aspen. Mature aspen stands are also used for nesting where these other forest types are not available. Goshawks typically prey on small mammals. They build their nests in the crotches of trees. A decline in populations of this species is associated with the lost of forested habitat.

The three-toed woodpecker nests and winters in northern coniferous forest and mixed-aspen forest types dominated by spruce, fir, pine, and aspen, usually above 8,000 feet elevation (Bull et al. 1986). Three-toed woodpeckers typically feed on wood-boring insects. The species is impacted by forest management practices such as clear cutting and stand-replacing wildland fires. Three-toed woodpecker populations are stable nationally, but there is little data to indicate their status in the planning area. Occurrence of birds or nests is rare.

Ruffed grouse habitat is closely associated with Dry Conifer, Aspen/Conifer, and Riparian cover types throughout the planning area. In the spring and summer, ruffed grouse feed on berries, seeds, fruit, and insects. Ruffed grouse winter in high-elevation timber where they feed on needles and buds of Douglas-fir. Riparian areas and aspen stands are important for ruffed grouse brood rearing due to the presence of insects, preferred forbs, and berry producing shrub species. Additionally, herbaceous cover is an important component of Brood Rearing Habitat, directly affecting areas of use and brood survival (Harju 1974; Zwickel 1972). Ruffed grouse are plentiful in wooded habitat in the planning area.

The red-naped sapsucker is a neotropical migrant that summers in Idaho and winters in Central America. It occurs in mixed conifer and aspen forests. They generally nest in the same tree year after year though not necessarily using the same hole. They prefer to be near riparian areas. The sapsucker diet includes sap from deciduous trees, pitch from coniferous trees, berries, and cambium. The species is impacted by forest management practices such as clear cutting and stand-replacing wildland fires. The state-wide Idaho population of red-naped sapsucker appears to be stable at approximatley 140,000 individuals (Rosenberg 2004).

The snowshoe hare typically lives in forested areas. In the summer, it has a thin brown coat that changes to a heavy, white coat in winter. In the winter, snowshoe hares feed on tree bark, woody twigs, and tree buds from aspen, willow, birch, maple, sumac, and alder. The hare also eats the needles of conifers, spruce, fir, cedar, and hemlock. In the summer, snowshoe hares feed on grasses, forbs, and shrub shoots. Hares typically rest or hide in abandoned animal burrows, logs, or low vegetation during the day. They feed at night. Snowshoe hares are preyed upon by many predators and are particularly important to Canada lynx. Other predators that use snowshoe hare as a food source include coyotes, foxes, weasels, bobcats, great horned owls, and larger hawks. Snowshoe hare populations in the planning area can fluctuate widely. Typically they depend on the availability of dense shrubby habitat combined with density of predation. Exact population dynamics for the planning area are unknown.

Important seasonal elk habitat areas are illustrated in Figure 3-7. Elk prefer habitats away from traveled roads, characterized by vegetation mosaics of timbered or brushy hiding cover and open sagebrush grassland foraging sites. Hiding and thermal cover is provided by timber stands, mountain mahogany, aspen-willow riparian zones, and rugged terrain closely associated with a wide range of cover types (i.e., Low-elevation Shrub and Mid-elevation Shrub, high-elevation Mountain Shrub, Wet/Cold Conifer, Dry Conifer, Aspen/Conifer, Juniper, and Riparian cover types). During spring, summer, and fall, close proximity to water is an important habitat factor that is provided by both natural and artificial sources throughout the planning area. Year-long or spring/summer/fall elk ranges are present throughout the planning area at higher elevations wherever forested habitat sites and topography provide good security from roads and other human activities. Major cover types preferred by summer elk include Aspen/Conifer, high-elevation Mountain Shrub, Dry Conifer, Mid-elevation Shrub, and Riparian cover types. Total elk habitat throughout the planning area and on BLM-administered land are shown in Table 3-22 and Table 3-23, respectively.

Moose populations in the planning area are believed to have increased since the late 1970s. Crucial winter and spring moose habitat exists within the Sands, Tex Creek, and Big Bend Ridge areas with winter population numbers sometimes exceeding 500 individuals per area (Idaho Department of Fish and Game [IDFG] 2002 (see Figure 3-5). These areas are characterized by Mid-elevation and Mountain Shrub species such as sagebrush and bitterbrush. These species, along with coniferous and deciduous trees, provide adequate winter forage and thermal cover requirements. Throughout the spring, summer, and fall, moose depend highly on riparian habitat areas as well as the adjacent Aspen/Conifer and Wet/Cold Conifer cover types, which provide calving, foraging, and thermal cover habitat needs. Most studies indicate that 90 percent or more of the moose diet contains fewer than seven different plant species (Schwartz 1992). Therefore, limiting factors for moose populations include degraded riparian and adjacent upland habitat conditions. Total moose habitat in the planning area and on BLM-administered land are shown in Table 3-22 and Table 3-23, respectively.

3.5.1.6 Salt Desert Shrub Habitat

The horned lark *(Eremophila alpestris)* is the only species analyzed for the Salt Desert Shrub cover type. The horned lark occurs throughout the planning area year-round. It occurs in open country, nests on the ground in shallow depressions, and feeds on insects, spiders, grass, and forb seeds. This species is quite adaptable and is quite common.

3.5.1.7 Riparian Habitat

Species analyzed as part of the Riparian Guild include deer, bald eagle *(Haliaetus leucocephalus)*, western yellow-billed cuckoo *(Coccyzus americanus)*, northern leopard frog *(Rana pipiens)*, boreal toad *(Bufo boreas)*, common garter snake *(Thamnophis sirtalis)*, Western terrestrial garter snake *(Thamnophsis elegans)*, and Yellowstone cutthroat trout *(Oncorhynchu clarki bouvieri)*.

White-tailed deer are predominantly found north of the Snake River; although small, localized populations are found throughout the remainder of the state (see Figure 3-4). They are closely associated with the major riparian areas in the planning area (e.g., Snake River, Henry's Fork of the Snake River, etc.) and the associated upland cover types, including the Low-elevation Shrub and Mid-elevation Shrub. Overall, white-tailed deer populations are healthy and are probably near all-time highs for the state (IDFG 1999). Total white-tailed deer habitat in the planning area and on BLM-administered land are shown in Table 3-22 and Table 3-23, respectively.

Bald eagle seasonal habitat occurs throughout the planning area, with the majority of nesting, brood rearing, and wintering habitats near major rivers. Twenty-four active nest sites occur on or near BLM-administered lands within the Greater Yellowstone ecosystem, resulting in high bald eagle productivity.

The western yellow-billed cuckoo is presently the only species in the planning area proposed by the USFWS to be listed as threatened under the ESA. Their present range and habitat occupation include the South Fork of the Snake River, where the associated cottonwood and Riparian cover type provides Nesting and Brood Rearing Habitat. Western yellow-billed cuckoos are obligate riparian nesters and are restricted to more mesic habitats along rivers, streams, and other wetlands (Johnson et al. 1987).

Northern leopard frogs can be found throughout the planning area, and populations appear stable. Northern leopard frogs are found in a variety of habitats, including grasslands, shrublands, woodlands, and forest habitats. They are generally associated with areas where there is a permanent water source and aquatic vegetation, including springs, slowly moving streams, marshes, bogs, ponds, canals, and reservoirs.

The boreal toad is listed by the State of Idaho as a sensitive species due to declining populations within the state. This species inhabits areas near springs, streams, meadows, and woodlands above approximately 7,000 feet elevation in Idaho. Boreal toads breed in wetland areas during May and June. Once the breeding season has ended, the adults tend to move away from wetland areas and toward moist coniferous forest. Boreal toad populations have been declining throughout their range because of habitat loss and degradation, environmental contaminants, and disease. This species is currently listed as a candidate species for listing under the ESA in Colorado, New Mexico, and Wyoming. The southeast Idaho population of boreal toad is thought to be part of this same candidate population (Petersen 2004).

The common and western terrestrial garter snakes occur throughout the Idaho in many habitats, including grassland and wooded areas. They prefer moist habitats, however, near riparian areas, lakes or damp meadows. Both species feed on toads, frogs, fish, salamanders, small mammals, earthworms, slugs, leeches, and insects. The common garter snake is relatively rare throughout the planning area (personal communication Dr. Charles Peterson, Professor of Biology, Idaho State University). The western terrestrial garter snake is common throughout the planning area. Yellowstone cutthroat trout are found in various tributaries of the Snake River in the planning area. Henry's Fork of the Snake River supports a productive sport fishery consisting of Yellowstone cutthroat trout, as well as rainbow trout *(Oncorhynchus mykiss),* and brown trout *(Salmo trutta)*. The South Fork of the Snake River also supports a productive sport fishery based on the native Yellowstone cutthroat trout. Loss of cold-water habitat, habitat degradation, and introduction of non-native sport fish such as brown trout, brook trout, and rainbow trout have all contributed to the decline of this species.

3.5.2 Federally-Listed Threatened and Endangered (T&E) and BLM-Sensitive Species

In the planning area, 41 T&E and BLM-Sensitive animal taxa are known to occur. Table 3-24 outlines these T&E and BLM-Sensitive species that are known to occur throughout the planning area and the cover types they are associated with. A list of these T&E and BLM-Sensitive species, their scientific names, and their life history are included in Appendix K or the Biological Assessment (BA) (Appendix O).

TABLE 3-24. T&E AND BLM-SENSITIVE SPECIES WITHIN THE PLANNING AREA, BY VEGETATION COVER TYPE

Vegetation Cover Type	Sensitive Species List
Low and Mid-elevation Shrub	T-2: Pygmy rabbit, greater sage grouse, St. Anthony Dunes tiger beetle, Idaho point-headed grasshopper. T-3: Loggerhead shrike, Brewer's sparrow, sage sparrow, Townsend's big-eared bat, California bighorn sheep, Piute ground squirrel, spotted bat, Townsend's big-eared bat T-4: Cliff chipmunk, Uinta chipmunk, Wyoming ground squirrel, kit fox, black-throated sparrow.
Perennial Grass	T-3: Columbian sharp-tailed grouse.
Juniper, Mountain Shrub, and Salt Desert Shrub	T-3: California bighorn sheep, prairie falcon, ferruginous hawk, Piute ground squirrel. T-4: Cliff chipmunk, Uinta chipmunk, Wyoming ground squirrel, little pocket mouse, Virginia's warbler.
Riparian	T-1: Bald eagle[1], western yellow-billed cuckoo, Snake River physa, Idaho springsnail, Bliss Rapids snail, Utah valvata snail, Banbury Springs limpet T-2: Northern leopard frog, boreal toad, greater sage grouse, Shoshone sculpin, Wood River sculpin, redband trout, Westslope cutthroat, Bonneville cutthroat, Yellowstone cutthroat. T-3: Columbian sharp-tailed grouse, calliope hummingbird, willow flycatcher, common garter snake, western toad.
Dry Conifer and Aspen/Conifer	T-3: Fisher, Lewis woodpecker, flammulated owl, northern goshawk, Williamson's sapsucker, Hammond's flycatcher, olive-sided flycatcher, fringed myotis
Wet/Cold Conifer	T-1: Gray wolf, grizzly bear, Canada lynx. T-3: Fisher, northern goshawk, Williamson's sapsucker, Hammond's flycatcher, olive-sided flycatcher.
Invasive Annual Grass	None

[1]The Bald eagle was delisted as a Threatened species on June 28, 2007.

T-1. Federally Threatened, Endangered, Proposed and Candidate Species

Idaho Sensitive Species

T-2. Rangewide / Globally Imperiled Species

T-3. Regional / State Imperiled Species

T-4. Peripheral Species

T-5. Watch Species (not considered as sensitive species)

3.5.3 RISKS

Wildland fires are a natural and necessary component of an ecosystem. Long-term fire suppression, without management to control hazardous fuels, results in large fires that are an imminent threat to wildlife and other resources. Uncharacteristic fires tend to burn with changed severity, frequency, or size from historic. When this occurs, wildlife habitats take longer to regenerate, and the wildlife habitat carrying capacity may be reduced for longer periods of time than would be expected under natural fire regimes. On the other hand, wildland fires in cheatgrass-dominated areas tend to recur at increasingly shorter intervals as the native vegetation is replaced by the highly flammable fine hazardous fuels of this Invasive Annual Grass. Under this scenario, wildlife habitats have no chance to recover, which results in permanent reductions in carrying capacity for multiple species.

Within the planning area, limiting factors to species such as elk, mule deer, and pronghorn include the loss of preferred shrubs from winter ranges, the loss of herbaceous cover, and the reduction in carrying capacity and fawning success. In the Aspen/Conifer cover types, fire suppression has resulted in late-seral stage aspen stands and monotypic conifer forests. Aspen forests are very important to many wildlife species, such as big game and birds, and support more biodiversity then monotypic conifer stands.

Increased wildland fire within riparian and adjacent to riparian habitat tends to increase the siltation and sedimentation of the water sources in the given area, in particuar the Snake River. This siltation and sedimentation has a negative effect on the aquatic creatures living in that water source. Several species of snail, including the Bliss Rapids snail and the Banbury Springs limpet, for instance, have experienced population declines due to the sedimentation of their water source.

3.5.4 OPPORTUNITIES

Vegetation treatments (WFU, RxFire, chemical, mechanical, and seeding applications) have both the short-term and long-term effects on wildlife. Although short-term effects are often detrimental to wildlife (e.g., temporary loss of habitat), the long-term effects of treatments would benefit both wildlife and the ecosystem health. Successful treatments in the planning area's various cover types would promote more natural fire regimes leading to restore habitats with higher values for wildlife.

Riparian areas can be held to healthier standards and would not be at high risk (burning or sedimentation) if the surrounding areas do not have excessive fuel loads. Areas where FRCC improves would have less risk of erosion and sedimentation. This, in turn, would reduce impacts to fish and other aquatic organisms.

Wildland fire at the historic frequency and severity would promote functioning ecosystems and landscapes that consist of a mosaic of successional stages across the landscape which benefits wildlife. Wildland fire would also stimulate the regeneration of fire-adapted species and rejuvenation of fire-tolerant species, while mechanical seeding would facilitate the recovery of the cover types where native species are poor or missing. Restoring native cover types would be beneficial to big game that feed on shrubs, grasses, and herbs as well as those species that use this mixed vegetation cover for fawning. In addition, fire treatments in Aspen/Conifer would permit the rejuvenation of the aspen stands that are essential for big game fawning areas and contribute to the biodiversity of forests.

3.6 AIR QUALITY

3.6.1 CURRENT CONDITIONS AND TRENDS

The EPA air quality permitting system suggests that analyses of air quality impacts should consider all airsheds within 100 km of proposed facilities or projects. To be consistent with this direction, the area of consideration for air resource impacts would be those airsheds over lands within the planning area as well as airsheds over lands within 100 km beyond the planning area boundary (Figure 3-8).

3.6.1.1 Applicable Air Quality Regulations and Policy

The basic regulatory framework for controlling air pollutants in the United States is the Clean Air Act (CAA) as amended in 1970, 1977, 1990, and 1999. This legal mandate was designed to protect human health and welfare from air pollution. National Ambient Air Quality Standards (NAAQS) are defined in the CAA as levels of pollutants, which detrimental effects on human health and welfare may result.

The EPA established NAAQS for six criteria pollutants: (1) carbon monoxide (CO), (2) nitrogen dioxide (NO_2), (3) ozone (O_3), (4) lead (Pb), (5) sulfur dioxide (SO_2), and (6) two categories of particulate matter – fine particulates with an aerodynamic diameter of 10µm or less (PM_{10}) and fine particulates with an aerodynamic diameter of 2.5 µm or less ($PM_{2.5}$). The primary standards for the criteria pollutants incorporate health effects. Levels are set to protect the health of the most susceptible individuals in the population, including the very young, the very old, and those with respiratory problems or other ailments. The EPA also established secondary standards, or quality of life standards for the criteria pollutants. Many of the secondary standards are set at the same levels as the primary standards. All of the standards are expressed as concentration and duration of exposure, including both short-term and long-term exposure. For example, the PM_{10} annual standard is 50 µg/m^3, and the 24-hour standard is 150 µg/m^3. Standards for $PM_{2.5}$, promulgated by the EPA in 2007, include an annual standard of 15 µg/m^3 and a 24-hour standard of 35 µg/m^3.

When an area within a state exceeds a NAAQS (usually around an urban center), it may be designated as a non-attainment area. Areas in which levels of a criteria pollutant measure below the health-based standard are designated as attainment areas. It is possible for a geographic area to be an attainment area for one criteria pollutant and a non-attainment area for another. Air-monitoring networks, which measure ambient air quality, have been established to determine whether an area meets the NAAQS. Monitoring sites, by design, are located in areas with the highest expected concentration levels, including both major urban areas and a few remote areas. Both filter-based and real-time monitors are used. A community with non-attainment status must demonstrate to both the public and the EPA how it would meet standards in the future. The State of Idaho Department of Environmental Quality (IDEQ) is tasked with preparing the preparation of an attainment plan to meet NAAQS for those areas in non-attainment by EPA-specified deadlines.

Under the EPA's Natural Events Policy, the EPA may exercise its discretion not to designate an area as non-attainment if high PM_{10} concentrations are attributable to wildland fire. However, the state is required to develop and implement a Natural Events Action Plan (NEAP) to respond to the health impacts of natural events. In March of 2002, the IDEQ completed a NEAP for Idaho in response to the extensive natural wildland fire events of 2000.

The 1977 CAA amendments clarified that the federal government is subject to CAA requirements. The 1990 CAA amendments required the EPA to establish transportation and general conformity regulations to address air pollution activities under the jurisdiction of the federal government. The General Conformity Rule was promulgated in November 1993 and applies to non-transportation related federal activities, including RxFire. A formal conformity determination must be made for projects planned within non-attainment or maintenance areas to show that the projects would not contribute to any NAAQS violations. As RxFire and WFU projects would typically not occur within non-attainment or maintenance areas, formal conformity determinations would be unnecessary. However, projects planned in the vicinity of non-attainment or maintenance areas would need to evaluate the potential impacts of emissions to these areas in project-specific NEPA analyses.

The 1977 CAA amendments set a national goal to "preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic, or historical value." Stringent air quality requirements were established for areas designated as Class I attainment areas. Class I areas include National Forest System (NFS) wilderness areas, national monuments over 5,000 acres in size, national parks over 6,000 acres in size, and international parks, all in existence as of August 1977. In July 1999, the EPA published the Regional Haze Rule, which requires all fifty states to develop visibility plans that address regional haze impairment to Class I areas affected both within and outside their state.

In May 1998, the EPA in cooperation with other federal land managers, states, and Tribal Governments, issued the Interim Air Quality Policy on Wildland and RxFires. One of the goals of this policy is to allow fire to function as a disturbance process on federally managed wildlands while protecting public health and welfare. It provides incentives for states to work with land managers to develop state smoke management programs. Smoke management programs can be certified by the EPA and are determined at the state's discretion to be either voluntary or mandatory.

3.6.1.2 Planning Area Air Quality

Montana and Idaho are currently managing smoke emissions from forest and range RxFire under the Montana/Idaho Smoke Management Program. Participants include landowners and managers (federal, state, Tribal, and private), IDEQ, and the National Weather Service. The program is voluntary in Idaho. Federal landowners must follow policy and write burn plans including actions to minimize fire emissions, a smoke dispersion evaluation, public notification, exposure reduction procedures, and an air quality monitoring plan. Burners submit planned burn lists at the beginning of the calendar year and report individual burns one day prior to ignition. A full-time meteorologist uses burn activity, weather, and air quality information to make daily go or no go recommendations for planned burns.

An airshed characterization report (Trinity 2003) was prepared to analyze the airsheds within the planning area (included as Appendix L). Idaho's dominant air pollutant is particulate matter from sources such as residential wood combustion, industrial emissions, automobile exhaust, agricultural activities, fugitive road dust, and open burning. Table 3-25 and Table 3-26 show average PM_{10} and $PM_{2.5}$ emissions for counties within the planning area and 100-km boundary.

TABLE 3-25. PM_{10} 5-YEAR ANNUAL AVERAGE EMISSIONS AND TRENDS

County	Non-attainment Area(s)	5-year Annual Average[1] (1995-1999)	Trend[2]
Bannock	Y	11,742	D
Bear Lake	N	4,640	D
Bingham	N	25,610	D
Blaine	N	8,928	D
Bonneville	N	20,355	D
Butte	N	3,291	D
Camas	N	5,556	I
Caribou	N	6,052	D
Cassia	N	14,550	D
Clark	N	1,442	D
Franklin	N	5,845	D
Fremont	N	8,736	D
Gooding	N	9,098	D
Jefferson	N	15,804	D
Jerome	N	10,710	D
Lincoln	N	3,667	D
Madison	N	9,687	D
Minidoka	N	11,802	D
Oneida	N	4,523	D
Power	Y	8,249	D
Teton	N	3,996	D
Twin Falls	N	25,564	D

[1] Tons/year.
[2] I= increasing/improving, D = decreasing.

TABLE 3-26. $PM_{2.5}$ 5-YEAR ANNUAL EMISSIONS AND TRENDS

County	Non-attainment Area(s)[1]	5-year Annual Average[2] (1995-1999)	Trend[3]
Bannock	NA	2,490	D
Bear Lake	NA	894	D
Bingham	NA	4,568	D
Blaine	NA	2,122	D
Bonneville	NA	3,914	D
Butte	NA	600	D
Camas	NA	4,041	I
Caribou	NA	1,334	D
Cassia	NA	2,814	D
Clark	NA	303	D
Franklin	NA	1,019	D
Fremont	NA	1,621	D
Gooding	NA	1,618	D
Jefferson	NA	2,903	D
Jerome	NA	1,939	D
Lincoln	NA	662	D
Madison	NA	1,757	D
Minidoka	NA	2,151	D
Oneida	NA	873	D
Power	NA	2,865	D
Teton	NA	749	D

[1] Not established for $PM_{2.5}$.
[2] Tons/year.
[3] I= increasing/improving, D = decreasing.

3.6.1.2.1 Airsheds

The State of Idaho has been divided into 16 airsheds (see Figure 3-8). An airshed is defined as a geographic area with similar topography and meteorology in which the airflow is contained the majority of the time. The planning area is located within all or portions of seven airsheds, including airsheds 17, 18, 19, 20, 21, 24, and 25. The majority of the planning area falls within airsheds 18, 19, 20, 24, and 25 with only minor portions falling within airsheds 17 and 21 (see Appendix L for further discussion). Table 3-27 includes the minimum and maximum PM_{10} and $PM_{2.5}$ emissions over a 5-year period (1995-2001) by airshed.

TABLE 3-27. PM_{10} AND $PM_{2.5}$ EMISSIONS (TONS/YEAR) OVER A 5-YEAR PERIOD, BY AIRSHED

Airshed	PM_{10} (min/max)	$PM_{2.5}$ (min/max)	Trend[2]
18	1,442/20,355	303/3,914	I
19	1,442/25,6101	303/4,568	I
20	4,523/25,610	873/4,568	I
24	3,291/8,928	600/4,041	I
25	3,667/25,564	662/5,298[1]	D

[1] highest value

[2] I=Increasing/Improving, D=Decreasing

3.6.1.2.2 Impact Zones

Impact zones are areas considered to be smoke sensitive by the IDEQ and are given additional air quality protection as needed. There are ten impact zones identified statewide, six of which fall within the planning area's airshed boundaries. They include Boise, Idaho Falls, Ketchum, Pocatello, Salmon, and Twin Falls (see Figure 3-8).

3.6.1.2.3 Class I Visibility Areas

In compliance with the EPA's Regional Haze Rule, the State of Idaho anticipates completingthe completion and implementing implementation of its visibility plan by the year 2004. Craters of the Moon National Monument and Preserve is the only Class I area located within the planning area boundary; however, there are eight other Class I areas within (or within portions of) the area of consideration, including the Sawtooth, Redrock Lakes, Jarbidge, Washakie, and Bridger wilderness areas and Grand Teton and Yellowstone National Parks (see Figure 3-8).

3.6.1.2.4 Attainment and Non-attainment Areas

IDEQ operates an extensive ambient air monitoring network to identify attainment and non-attainment areas. Within the planning area boundaries, there is one PM_{10} non-attainment area: which is the Fort Hall Indian Reservation (a Tribal/EPA PM_{10} non-attainment area). Previously, the Portneuf Valley (Pocatello area) had been considered a PM_{10} non-attainment area but recently has been redesignated to attainment status and is presently listed as a maintenance area. Other PM_{10} non-attainment areas within the area of consideration include the northern portion of Ada County (Boise area) and the northern portion of Davis County, Utah including the city of Ogden. Violations primarily consist of an exceedence of the 24-hour standard during the winter months, when strong inversions trap pollutants. Non-attainment areas are shown in Figure 3-8.

Attainment designations for $PM_{2.5}$ in Idaho would not be established until 2008 at the earliest. The Cache Valley (Logan, Utah and Franklin and Preston, Idaho) would be designated as $PM_{2.5}$ nonattainment area in 2008. Other areas in the state that may become non-attainment for $PM_{2.5}$ in 2008 include Boise (Treasure Valley), Salmon, and Pinehurst.

3.6.1.2.5 Sensitive Areas within the Planning Area

Sensitive areas are locations such as NAAQS non-attainment areas, counties with existing high levels of PM emissions, hospitals, airports, Class I visibility areas, and major transportation corridors. Fire treatments in these areas may cause additional concerns for sensitive populations. Table 3-28 shows sensitive locations in the planning area.

TABLE 3-28. SENSITIVE AREAS ACROSS THE PLANNING AREA

County	Sensitive Areas
Bannock	Maintenance Area, Northwestern Band of Shoshone Health Center, Pocatello Regional and Porteneuf Regional Medical Centers, Hyde Memorial Airport, I-15, I-86, US 30, US 91
Bear Lake	Bear Lake Regional Hospital, Bear Lake County Airport, US 30, US 89, I-15
Bingham	Bingham Memorial and State Hospital South, Aberdeen Municipal Airport, McCarley Field, I-15, I-86, US 39, US 26, US 20, US 91
Blaine	Wood River Medical Center, Bellevue, Sun Valley, Class I (CRMO, Sawtooth National Rec. Area), Airport (Friedman Memorial), US 20, US 26, US 93, ID 75
Bonneville	Eastern Idaho Regional Medical Center, Fanning Field, Dubois Municipal Airport, I-15, US 22, US 26, US 91
Butte	Lost Rivers District Hospital, Class I (CRMO), I-15, I-86, US 20, US 26, US 93, Arco-Butte County Airport
Camas	US 20, ID 46, Camas County Airport
Caribou	Caribou Memorial Hospital, Allen H. Tigert and Bancroft Municipal Airport, I-15, US 30, US 34
Cassia	Cassia Regional Medical Center, I- 84, I- 86, US 30, Burley Municipal Airport, Oakley Municipal Airport
Clark	I-15
Elmore	I-84, US 20, US 26, US 30, ID 51, ID 67
Franklin	Franklin County Medical Center, Preston Airport, I-15, I-84, I-80, US 91
Fremont	Class I (Yellowstone National Park), Stanford Field, I-15, US 20
Gooding	Gooding County Memorial Hospital, Hagerman, I-84, US 26, US 30, ID 46, Gooding Memorial Airport
Jefferson	Class I (Camas NWR), I-15, US 20, US 26, Rigby-Jefferson County Airport
Jerome	St. Benedict's Medical Center, I-84, US 25, US 26, US 30, US 93, Hazelton Municipal, Jerome County Airport
Lincoln	Class I (CRMO), US 24, US 26, US 75, US 93
Madison	Madison Memorial Hospital, Rexburg-Madison County Airport, US 20
Minidoka	Class I (Minidoka NWR, CRMO), I-84, I-86, US 30
Oneida	Oneida County Hospital, Malad Airport, I-15, I-84
Power	Non-attainment (Fort Hall Indian Reservation), Maintenance area (state land) Harms Memorial Hospital, American Falls and Pocatello Regional Airports, Class I (CRMO), I-15, I-84, I-86
Teton	Class I (Grand Teton National Park), Driggs Municipal Airport, I-15, US 20, US 26
Twin Falls	Magic Valley Medical Center, Twin Falls Clinic and Hospital, Joslin Field, Buhl Municipal, I-84, US 30, US 74, US 93

3.6.1.3 Climate Change

Climate change is closely interrelated and synergistic with other important threats including wildfire and annual grasslands (ISAC 2006). The purpose and need for this plan amendment is based in part on the observable trend in the increase of natural fire occurrences and intensities in the planning area and all of the action alternatives address this purpose and need. The assessment of the impacts of climate change is in its formative phase; yet the evidence for human-induced climate change at the global level is increasing. The Intergovernmental Panel on Climate Change recently concluded that "warming of the climate system is unequivocal" and the "most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [man-made] greenhouse gas concentrations" (IPCC 2007). However, it remains difficult to accurately predict how climate change will impact any particular area with any credibility (Brown et al. 2005).

The Conservation Plan for the Greater Sage-grouse in Idaho (July 2006) identified climate change as one of the 19 greatest threats to sage-grouse and their habitat (ISAC 2006). This document, which is incorporated here by reference, describes the potential impacts of climate change on rangeland vegetation types and acknowledges "the response of rangeland vegetation to impending changes in the precipitation regime is likely to be complex and difficult to predict from existing knowledge." This document also recognizes that maintaining and enhancing ecosystem resilience will be a key to successfully managing rangelands in a changing climatic environment.

3.6.2 RISKS

Fire, either natural or managed, produces ozone, carbon monoxide, and particulate matter. While ozone is a byproduct of fire, ozone exposures are infrequent. Carbon monoxide production from fire poses little to no risk to public health because it is rapidly diluted at short distances from a burning area and is dispersed both spatially and temporally (Sandberg and Dost 1990). The pollutant of most concern to public health and safety is particulate matter. Large volumes of particulate matter can be produced from burning vegetation and, depending on meteorological conditions, may affect large areas for extended periods of time.

Without fire, fuels, and vegetation management planning, fuel loads in some areas have the potential to cause more intense wildland fires that can burn for long periods of times. Thus, there is the potential that that uncontrolled wildland fires can cause greater air pollutant emission levels, increasing air quality impacts.

3.6.3 OPPORTUNITIES

Reducing the occurrence of large wildland fire would also reduce negative impacts to air quality. Reduction in fuel loads would result in less overall risk to air quality. While RxFire and WFU are tools for reducing unwanted fires and could potentially contribute to temporary reductions in air quality, fire size and intensity would be much less over the long term than that of current wildland fire and would result in less air pollutant emissions over time. The Interim Air Quality Policy on Wildland and RxFires, which allows fire to function as a disturbance process on federally managed wildlands, includes incentives for states to work with land managers to develop state smoke management programs.

3.7 SOILS

3.7.1 CURRENT CONDITIONS AND TRENDS

3.7.1.1 Geomorphology

The planning area falls into four physiographic provinces:

- Columbia Plateau – Snake River Plain Section
- Basin and Range – Great Basin Section
- Middle Rocky Mountains
- Northern Rocky Mountains

The Snake River Plain section of the Columbia Plateau province is located centrally in the planning area and contains the Snake River and a series of level to gently sloping Quaternary and Tertiary basalt lava fields, extending over much of the plain. Inactive volcanic cinder cones protrude from the relatively smooth lava fields. The lava fields abruptly meet on either side of the Snake River flood plain, occasionally forming steep, black cliffs (e.g., the Twin Falls area). Basalt fields were formed in south-central Idaho in the late Tertiary and volcanic activity migrated eastward into southeast Idaho through the early Quaternary (Link et al. 1988).

The Great Basin section of the Basin and Range province is characterized by a series of north-south trending mountain ranges and valleys. Bedrock geology in the mountains is complex with consolidated geologic deposits ranging in age from late Proterozoic (1,000 million years ago) to Tertiary (2.6 million years ago). Valleys typically consist of unconsolidated Quaternary (2.6 million years ago to present) sediments. Mountains in the Basin and Range were formed by the late Paleozoic Antler orogeny and the Mesozoic Sevier orogeny.

The Middle And Northern Rocky Mountains were formed at roughly the same time in the Mesozoic and early Tertiary, between 170 and 40 million years ago by three orogenic events. The final event, the Laramide orogeny, was responsible for raising the Rockies to their current height and extent. These two provinces are distinguished from each other in the following manner: the Northern Rockies form narrow valleys between densely clustered mountain ranges, and the Middle Rockies are composed of mountains ranges with many intermountain plains and basins. The Tetons form the northwestern-most boundary of the Middle Rocky Mountains province (Link et al. 1988).

3.7.1.2 Soils

Soil mapping and soil attribute data for the planning area were acquired from the State Soil Geographic (STATSGO) database. Soils data for most of the planning area are available from this database, but coverage is incomplete. STATSGO was designed for regional, multistate, river basin, state, and multicounty resource planning and management (USDA 1994). Soil attribute data are assigned to each soil mapping unit, making large-scale management interpretations possible.

Soil depth in the planning area is generally deep (greater than 48 inches to bedrock) on flat, low terrain of the Snake River Plain (0 percent to 15 percent slope). On gently rolling uplands (0 percent to 30 percent slope), slightly altered bedrock is often more than 40 inches below the surface. On more rolling lands (20 percent to 50 percent slope), the depth to bedrock is approximately 20 inches to 40 inches. On steep slopes (30 percent to 60 percent slope), soil depths range from less than 10 inches to 20 inches and overlie partly weathered bedrock. Rock outcrops are common on steeper slopes with little or no soil development. Rock outcrops are exposed, rocky, erodible surfaces that do not have any soil development on them. Badlands are composed of unstable geologic deposits that exhibit little to no soil development and do not support plant growth. Table 3-29 summarizes the acreage of the soil orders, water bodies, rock outcrop, and badlands on BLM-administered lands in the planning area.

Soils of the planning area are primarily of five soil orders: (1) Entisols, (2) Inceptisols, (3) Aridisols, (4) Alfisols, and (5) Mollisols. These soil orders are described below. The geographic distribution of the five soil orders appears in Figure 3-9.

TABLE 3-29. ACREAGES OF SOILS AND OTHER LANDFORMS IN THE PLANNING AREA

Soil Order (or Land Type)	BLM-administered Acreage[1]	Total Acreage (Federal, State, and Private)[1]
Entisols	125,607	897,561
Inceptisols	231,075	778,998
Aridisols	2,693,501	5,976,233
Alfisols	55,960	337,887
Mollisols	2,169,412	10,633,633
Waterbodies	7,780	217,067
Rock Outcrop	52,390	596,778
Badlands	20,250	66,142

[1] Acreage calculations based on STATSGO-level soils data.

Entisols are immature, mainly azonal soils (soils that are not layered) 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. Examples of Entisols include floodplain soils, playa soils, and loess deposits commonly found overlying basalt flows in the eastern portion of the planning area.

Inceptisols are young soils with weakly developed horizons. Inceptisols are older and more developed than Entisols. Inceptisols tend to occur with Mollisols in montane regions of the planning area, on fairly stable mountain slopes (e.g., in the Island Park area), where these soils tend to be wet. Montane Inceptisols are susceptible to water erosion if unvegetated.

Aridisols are semi-desert and desert soils that occur on dry but more stable sites than Entisols and Inceptisols and exhibit more surface horizon development. Aridisols are widely distributed through the planning area and occur within the Snake River Plain and Portneuf River Valley (e.g., on lava flows). Aridisols tend to be high in calcium carbonate (lime), making these soils very basic in terms of pH. Older Aridisols may develop a clay-rich horizon as well. Organic matter production in Aridisols is minimal, but soil surfaces are relatively stable, which allows for the development of thin, darkened surface horizons. 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 grades during infrequent rainstorms.

Alfisols are acidic, forested soils with a clay-rich subsurface horizon, and 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 than Inceptisols and Entisols. Alfisol surfaces are subject to water erosion and soil compaction when moist.

Mollisols are generally found in grasslands, shrub-steppe, Mountain Shrubland, and along riparian zones. These soils are neutral to alkaline, with an organically rich and productive surface horizon. Mollisols are found in a variety of precipitation zones throughout the planning area. These soils receive sufficient precipitation to allow for accumulation of organic matter that creates a relatively thick organic-rich surface horizon. Mollisols are very productive, relative to the other soils discussed above. Mollisol surfaces are subject to water erosion and soil compaction when moist. When their surfaces are exposed, Mollisols are also susceptible to wind erosion.

3.7.1.3 Biological Crusts

Biological crusts are composed of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria. They are a common element of plant communities in arid and semiarid environments worldwide. Biological crusts reduce soil erosion by wind and water, fix atmospheric nitrogen and carbon, help retain soil moisture, and provide a living organic layer on the soil surface. Development of biological crusts is strongly influenced by a number of physical and environmental factors including soil texture and chemistry, as well as amount and timing of seasonal precipitation (Belnap et al. 2001). Biological crusts are components of several of the vegetation types within the planning area, including Salt Desert Shrub, Low Elevation Shrub, and Mid-Elevation Shrub. They are less abundant in vegetation types where plant densities naturally preclude their presence, including Mountain Shrub, Dry Conifer/Aspen, and Wet/Cold Conifer.

3.7.2 RISKS

3.7.2.1 Geomorphology

Active, historical, and prehistoric landslides are evident in the montane and steeply-sloped areas of the planning area. Landslides are caused by several factors acting separately or congruously, including:

- Steep slopes
- Saturation of sediments
- Wetting along planes of structural weakness
- Lithology (bedrock composition)
- Tectonic movement
- Human disturbance
- Loss of vegetation

Saturation and steep slopes are common conditions in most landslides. Saturation increased the weight of sediments on steep slopes, potentially triggering landslides. Wetting along planes of structural weakness can lubricate the contact between two masses, also leading to slippage. Bedrock geology can also influence landslide potential depending on the dip of the bedrock. Bedrock stratigraphic planes running parallel to the slope of the land can increase the chances of landslide occurrence as well. Again, wetting along planes of structural weakness in bedrock can cause entire slopes to slip.

Active faults are located throughout the planning area. Tectonic activity causes the movement of fault blocks, shifting the earth's surface and causing large erosion and landslides. Human disturbance such as mining can also destabilize slopes, leading to landslides (Othberg 1984).

Post-fire landslides include fast-moving, highly destructive debris. These events usually occur in response to high-intensity rainfall. Post-fire landslides are particularly hazardous because they can occur with little warning, sending loads of sediment onto objects in their paths, stripping vegetation, blocking drainage ways, damaging structures, and endangering human lives.

3.7.2.2 Soils

The responses of a soil to fire often vary with soil texture and soil chemistry, as well as topographic, climatic, and ecological attributes of the landscape; fire residence time and the fire severity also impact soil conditions. Burning off the protective vegetative cover exposes the soil to wind (particularly on sandy soils) and water erosion on steeper slopes, which contributes to the loss of organic matter and reduces productivity.

Water erosion is influenced by the intensity and duration of precipitation, soil texture, soil organic matter, permeability, topography, and cover by vegetation or artificial cover. Water erosion is exacerbated on burned slopes; runoff is increased (water infiltration rates are usually lower in burned soils [Martin and Moody 2001]). Burning in steep montane areas has the potential to increase soil erosion rates as much as 200 times the pre-fire condition (Martin and Moody 2001).

Wind erosion has the potential to move as much as 200 tons/ac in 3 months in exposed, burned areas. Wind erosion also decreases soil productivity and exposes plant roots, impeding revegetation efforts (Brady 1990).

Water erodible soils were determined from the slope percentage (greater than 10 percent) and the erodibility (K) factor. Figure 3-10 shows the extent of water erodible soils in the planning area.

Wind erodibility was determined from the Wind Erodibility Group (WEG), which ranges from 1 to 8. Soils in WEG 1 and 2 are severely erodible. Soils in WEG 3 to 5 are moderately erodible. Figure 3-10 displays soils with moderate and severe wind erodibility in the planning area. Table 3-30 summarizes acres of erodible soils. These thresholds were adapted from the BLM's Soil Suitability Extension (v. 1.0) User's Guide (BLM 2001).

TABLE 3-30. ACREAGES OF ERODIBLE SOILS IN PLANNING AREA

Erosion Type	BLM-administered Acreage[1]
Wind Erodible Soils	
Severely Erodible	421,381
Moderately Erodible	2,924,072
Water Erodible Soils	819,425

[1] Acreage calculations based on STATSGO-level soils data.

3.7.2.3 Biological Crusts

Severity, size, frequency, and timing influence the impact of disturbances on biological crusts. Disturbances that kill crustal organisms over large areas slow recovery. Factors that influence the presence of biological crusts on a site also affect recovery rates. For example, biological crusts on fine-textured soils may recover may recover more quickly than those on coarse-textured soils, because smaller soil particles are more easily stabilized. However, recovery rates ultimately depend on numerous site specific factors, including the severity and scale of the disturbance, type of biological crust present, overall recovery of the plant community, and type and frequency of subsequent disturbances (Belnap et al. 2001).

3.7.3 OPPORTUNITIES

3.7.3.1 Geomorphology

Reducing the occurrence of large wildland fire could reduce the consequences of wildland fire to geological resources, particularly for wind, water, and geologic erosion. The use of RxFire and other vegetation treatments to control large fire would result in lessened losses of vegetative cover, allowing for better infiltration of water, stabilization, and regrowth of vegetation, thereby reducing the risk of landslides.

3.7.3.2 Soils

Fire management actions could have short-term negative consequences on soil resources through the clearing of surface vegetation and exposure of bare soils. However, in the long term, it is expected that fire-related risks to soils would be reduced. RxFire and vegetation treatments would reduce fuel loads, fire severity, and fire size. This in turn, would allow the preservation of organic material and some vegetation on the soil surface, thereby reducing long-term risk of soil erosion.

3.7.3.3 Biological Crusts

Opportunities for biological crusts would be similar to those described above in Section 3.7.3.2 Soils.

3.8 WATER RESOURCES

3.8.1 CURRENT CONDITIONS AND TRENDS

Watersheds, aquifers, rivers, and streams are ecologically dynamic interfaces of atmosphere, soils, and water. Healthy watersheds capture precipitation and runoff, store water in the soil profile, and release it slowly back into the landscape surface waters. Denuded watersheds are subject to accelerated soil erosion, reduced soil moisture, poor plant growth, and the loss of other ecosystem components.

The geologic provinces of the region's landscape help define various types of surface waters: lakes, ponds, and reservoirs; ephemeral springs and seeps; steep brooks; meandering streams; seasonally flooded meadows and playas; rivers, rapids, and riffles; and reaches in narrow, rocky canyons. Figure 3-11 depicts the major surface water features within the planning area. Surface waters on or adjacent to planning area public lands total over 18 square miles and nearly 1,500 linear miles (Table 3-31).

TABLE 3-31. EXTENT OF RIVERS AND STREAMS IN THE PLANNING AREA, INCLUDING 303(D)-LISTED STREAMS

Field Office	River and Streams (acres)	River and Streams (miles)	303(d)-listed Streams (miles)
BFO	1,061	155	45
USFO	10,015	462	150
PFO	478	590	57
SFO	71	269	69
Planning Area Total	**11,625**	**1,476**	**321**
	(or 18.2 square miles)		

Source: D. Kotansky, BLM planning area hydrologist.

Watersheds within the Columbia Plateau and the Rocky Mountain system form part of the Interior Columbia hydrologic region, with the Snake River Plain functioning as a major hydrological surface feature. The Snake River Plain is broad lowland thought to have formed over the past 17 million years by the southwestward migration of the North American tectonic plate over a stationary "hot spot" of the earth's mantle currently located under the Yellowstone Plateau (Pierce and Morgan 1992).

Major rivers that drain the planning area include Snake River, Malad River, Henry's Fork of the Snake River, Blackfoot River, Portneuf River, Raft River, Salmon Falls Creek, Big and Little Wood Rivers, Big and Little Lost Rivers, Bannock Creek, Birch Creek, Camas Creek, Goose Creek, and Medicine Lodge Creek. Peak flows on the Snake River and its tributaries occur between mid-April and mid-July as a result of snowmelt and rainfall; spring and early summer runoff may be 20 to 50 times average flow. Average flows are maintained during the remainder of the year by groundwater and spring discharges. During summer, high-intensity and widely dispersed convective thunderstorms may produce sporadically high discharges of short duration.

A portion of the Great Basin hydrologic region is present within the southeast corner of the planning area. The Bear River is the major drainage for this portion of the Great Basin. Additional tributaries of Bear River that are within the planning area include the Malad River and Deep Creek.

Water quality can be affected by numerous factors such as nitrogen and/or phosphorous loading, particulate suspension, sediment deposition, temperature flux, and oxygen deficits. Within the planning area, nitrogen, in the form of nitrate, is a major pollutant of groundwater that is being addressed by the State of Idaho to improve groundwater resources.

The Federal Water Pollution Control Act (FWPCA) of 1972 and the Clean Water Act (CWA) of 1977 and subsequent amendments/revisions are the dominant federal legislations that direct the management of water quality on BLM-administered lands. The CWA directs restoration and/or maintenance of the chemical, physical, and biological integrity of our nation's waters, while Section 303 primarily dictates further compliance to state and local water quality standards. The BLM must also comply with IDEQ water quality standards.

Water quality on BLM-administered land streams is largely directed towards achieving Total Maximum Daily Load (TMDL) compliance on 303(d)-listed streams. Water quality conditions vary due to a wide variety of natural perturbations and human-derived activities (e.g., forestry, livestock, agriculture, mining, recreational impacts, as well as diversions, canals, reservoirs, city, industrial, and residential water supplies, etc.). Taking all these contributing factors into account, while recognizing the complexity of land status adjacent to waterways in the planning area, the BLM recognizes that cooperation among individuals, municipalities, the IDEQ, and other agencies is required to achieve and maintain state water quality standards.

Under Section 303(d) of the CWA, the IDEQ is to list all waters that do not meet water quality standards or have impaired beneficial uses (e.g., drinking water, recreation, etc.). Streams in which water quality is impaired are referred to as "303(d)-listed streams" or "water quality-limited streams." The EPA and IDEQ monitor and evaluate TMDLs for listed streams. The TMDL estimates the maximum pollution that a water body can contain until it no longer supports beneficial uses (i.e., it is water quality-limited). Monitoring of TMDLs is coordinated among private, state, and federal entities. On BLM-administered lands, the BLM is mandated to reduce pollutants to 303(d).

Approximately 22 percent of the total miles of planning area streams are listed as 303(d)-listed streams. At present, Bitterroot Restoration, Inc. (Corvallis, Montana) maintains an online database for riparian and wetland health assessments for most of the planning area (Hansen et al. 1993 through 2000). This database contains assessments of the current proper functioning condition (PFC), functional-at-risk, and non-functional 303(d)-listed streams, as developed by the Montana Riparian and Wetland Association (MRWA), University of Montana (BLM 1993).

Overall, approximately 30 percent of 303(d)-listed stream miles in the planning area are PFC, approximately 49 percent are functional-at-risk, and approximately 8 percent are non-functional.

The BLM also manages two municipal watersheds, which provide drinking water for the communities of Downey in Bannock County (PFO) and Victor in Teton County (USFO). The Downey Municipal Watershed is a complex of protected springs composing a 1,800-acre watershed (BLM 1988). The Victor Municipal Watershed is a complex of forested springs comprising 1,360 acres (BLM 1985). Any vegetation treatments within these watersheds must amply protect these municipal water sources.

3.8.2 Risks

Either wildland fire or human-controlled vegetation management can result in the modification to the timing and flow of surface water resources. These consequences could result from changes in the interception, infiltration, soil moisture storage, possibly snow accumulation, and snowmelt rate. The magnitude of these potential impacts would be a function of the intensity of a wildland fire, type of vegetation burned, the size and pattern of the burn, and precipitation pattern and quantity. Erosion caused by these impacts would be the most obvious, and would result in increases in stream sedimentation. Sedimentation has several indirect consequences, including decreased storage capacity of downstream public water supplies, increased turbidity, decreased dissolved oxygen, and temperature changes.

The amount of time between a burn and a significant precipitation event is another important factor influencing watershed response to fire. Light burns followed by intense thunderstorms can have large impacts; while high severity burns followed by a wet warm summer dominated by gentle rains could promote rapid revegetation and lessen watershed impacts.

As slope increases, soils dry quicker, the rate of revegetation can slow, and the susceptibility of erosion increases. While erosion after fire may be within the historical range of variation, impacts could be serious and undesirable if (1) erosion rates in a watershed are already elevated and accelerated by other management activities, (2) streams are already non-functional or functional-at-risk, or (3) important developments such as towns, reservoirs, and facilities exist in a floodplain, at a canyon mouth, or in other high-risk locations.

3.8.3 Opportunities

Reducing the impacts of large wildland fire could reduce the risks discussed in Section 3.8.2. By reducing the burn area and wildland fire intensity, in conjunction with any and all vegetation treatments, vegetation cover can be maintained or restored/rehabilitated relatively quickly following a fire. Fire management actions followed by effective restoration/rehabilitation would reduce sedimentation and water quality impacts to surface water resources.

3.9 LIVESTOCK GRAZING MANAGEMENT

3.9.1 CURRENT CONDITIONS AND TRENDS

Livestock grazing occurs approximately on 4.6 million acres, or 85 percent of BLM-administered land in the planning area. For grazing administrative purposes, the planning area is divided into approximately 1,300 grazing allotments. Currently, approximately 90 percent are actively grazed, 2 percent are allocated but not currently grazed, and approximately 8 percent are not allocated but available for grazing. About 800,000 acres may or may not be available for livestock grazing, depending on the specific land-use plans.

BLM-administered grazing allotments can be used by one operator as an individual allotment, or by many operators in a common allotment. There are approximately 1,145 different livestock operators authorized to graze livestock on active grazing allotments. The grazing allotments vary in size from less then 10 acres to 318,000 acres. Several of the livestock operations include private, state, and NFS lands in addition to BLM-administered lands.

Each allotment has a specific geographical area of use, season of use, and permitted number of animal unit months (AUMs). One AUM is equal to the amount of forage used to support one cow and calf for one month (approximately 800 pounds of forage). Under normal conditions, the planning area would authorize the active preference of 668,206 AUMs annually. Cattle, horses, and sheep are currently grazed on lands included in the planning area. Table 3-32 identifies the distribution of AUMs Active Preference for the planning area by livestock type.

TABLE 3-32. ANIMAL UNIT MONTHS (AUMS) ACTIVE PREFERENCE WITHIN THE PLANNING AREA, BY LIVESTOCK TYPE

Livestock Type	AUMs Active Preference	Percent of AUMs
Cattle	489,905	73
Horses	1,807	<1
Sheep	172,619	26
Other (e.g., bison, goats)	3,875	<1
Total	**668,206**	**100**

Not all the permitted AUMs are licensed for use each year. Annual fluctuation in AUMs licensed each year is due to many factors, including weather conditions, livestock markets, and individual operator considerations. For the period of 1990 through 2001, the number of AUMS licensed annually for livestock grazing has increased from a low of 207,329 AUMs (1992) to a high of 513,438 AUMs (2000) with the average licensed use being 322,974 AUMs for this period.

Livestock grazing occurs to some extent in most cover types including Low-elevation Shrub and Mid-elevation Shrub, Invasive Annual Grass, Perennial Grass, Salt Desert Shrub, Mountain Shrub, Juniper, Aspen/Conifer, Dry Conifer, Wet/Cold Conifer, and Riparian. The season of use and the number of acres needed to produce forage to support one AUM depends upon the particular cover types found within respective allotments. Across the planning area, livestock use is licensed from seasonal to year-long use. The majority of allotments are grazed in spring/summer/fall, spring, and spring/fall. Minimal grazing use occurs in the winter months (Table 3-33).

TABLE 3-33. SEASONS OF USE AND PERCENT OF ALLOTMENTS AUTHORIZED

Seasons of Use[1]	Percent of Allotments Grazed	Percent of AUMs Active Preference
Spring/Summer/Fall	31	33
Spring	29	5
Spring/Fall	17	19
Spring/Summer	8	8
Year-long	5	18
Summer/Fall	3	1
Summer	2	1
Fall	2	<1
Fall/Winter	1	<1
Spring/Fall/Winter	1	12
Winter	<1	<1
Summer/Winter	<1	<1
Spring/Winter	<1	1

[1] Spring (Mar-May), Summer (Jun-Aug), Fall (Sep-Nov), Winter (Dec-Feb).

3.9.2 RISKS

Wildland fires generally occur throughout the planning area beginning in July and ending mid-September. Rehabilitation of wildland-fire-burned areas are generally initiated in the fall and completed in the winter. Livestock operators with allotments that have grazing seasons beginning or extending into the summer and fall periods can be directly affected by wildland fire activity. After areas burn and/or rehabilitation activities occur, livestock grazing may be temporarily suspended. Available forage is lost and areas of use may be closed to promote recovery of burned perennial plants and/or the establishment of seeded species. On a case-by-case basis, livestock grazing of closed areas may resume when resource objectives identified in site-specific project plans and/or NEPA documents have been met and documented through project-specific monitoring.

During the period of 1990 through 2001, wildland fires have burned an average of approximately 110,500 acres within active grazing allotments. This resulted in an annual average of 2 entire allotments and portions of 56 allotments being burned. The burns and subsequent rehabilitation efforts resulted in an annual average of 3 allotments closed entirely to livestock grazing and portions of 23 allotments closed to livestock grazing per year. On average, there is a 10 percent temporary reduction in AUMs annually due to the current fire regime, rehabilitation, and restoration efforts.

Treatments for reducing fire hazards are generally initiated in the fall and completed in the early winter. Livestock operators with allotments that have grazing seasons beginning or extending into the fall and winter periods can be directly affected by treatment activities. As these treatments are initiated, temporary removal of livestock is required to ensure success of the particular treatment and establishment of desired vegetation.

3.9.3 Opportunities

Livestock grazing can experience long-term benefits from restoring the role of fire in the planning area ecosystems, treating areas identified for hazardous fuels reductions, preparing areas for seeding, improving wildlife habitat and improving vegetation condition. Treatments to reduce hazardous fuels, rehabilitate burned areas, control invasive species, and decrease wildland fire activity can result in the following: (1) less acres being burned by wildland fire activity, (2) reducing the number of allotment closures and AUMs temporarily unavailable, (3) maintaining or improving the health of the land, (4) improving wildlife habitat/watershed conditions, and (5) forage banking.

3.10 RECREATIONAL RESOURCES

3.10.1 Current Conditions and Trends

BLM-administered lands provide a setting for dispersed as well as developed recreational opportunities, which in the planning area include, but are not limited to, hunting, fishing, sightseeing, mountain biking, hang gliding, Off-highway Vehicles (OHV) and snowmobile use, cross country and alpine skiing, hiking, camping, caving, river running and boating, horseback riding, and picnicking. These activities are managed through special recreation permits, camping and picnic facilities, roads and trails, information signs, and bulletin boards and kiosks. Some of the major attractions within the planning area include the Craters of the Moon National Monument and Preserve, City of Rocks National Reserve, Bald Mountain Recreation Area, the historic Oregon Trail, and the Snake River.

3.10.1.1 Developed Recreation Sites

The planning area supports 56 developed recreation sites. Those sites that are heavily used or visited, and might be impacted by fire or associated activities include:

- Milner Historic/Recreation Area
- Pocatello West Bench Area
- Black Rock Canyon
- Blackfoot River
- Oneida Narrows

- North Ketchum Special Recreation Management Area (SRMA) (see Section 3.10.1.2 below)
- Bennett Hills SRMA
- Magic Reservoir
- Big Wood River
- Thorn Creek Reservoir
- Silver Creek
- Bald Mountain SRMA
- Gooding City of Rocks
- South Fork of the Snake River Corridor
- Henry's Lake
- Salmon Falls Reservoir
- All hang-gliding staging areas
- All rock-climbing areas

3.10.1.2 Special Recreation Management Areas (SRMAs)

An SRMA is an area where a commitment has been made to provide specific recreational activity and experience opportunities. These areas include recreation sites, but recreation sites alone do not constitute SRMAs, as SRMAs usually require a higher level of recreational investment and/or management. There are 21 SRMAs within the planning area, listed in Table 3-34.

3.10.1.3 Wild and Scenic Rivers

Congress and the President have the authority to designate wild and scenic rivers or river segments on BLM-administered land as part of the National Wild and Scenic Rivers System. Each designated river or river segment may be classified as wild, scenic, or recreational. Currently, there are no designated wild and scenic rivers that lie within the planning area planning area; although, there are 11 stream segments in the planning area that have been found eligible for future suitability study. These would be reviewed to see if they are appropriate for addition to the Nationwide Wild and Scenic Rivers System. The eligible segments and their lengths are listed in Table 3-35.

Until the suitability study is completed, all of these eligible segments are being managed by their respective field offices to: (a) protect the streams' free-flowing character; (b) maintain the level of development that resulted in the segments' tentative classifications as wild, scenic, or recreational; and (c) protect the outstanding values, which qualified the stream segments as eligible for further study.

TABLE 3-34. SPECIAL RECREATION MANAGEMENT AREAS (SRMAS) WITHIN THE PLANNING AREA

SRMA	Acres	Major Recreational Activities
St. Anthony Sand Dunes (USFO)	36,900	OHV, horseback riding, hiking, camping, wildlife viewing, snow sports
Snake River System (USFO)	15,352	Fishing, camping, boating, hunting, hiking, skiing, wildlife viewing, picnicking
Birch Creek/Lost Valleys (USFO)	493,239	Camping, fishing, hunting, rock climbing, OHV and pleasure driving, hang-gliding, wildlife and cultural viewing
Big Desert (USFO)	834,225	Hunting, camping, OHV and pleasure driving, caving, wildlife/historic trail viewing, photography
Magic Reservoir (SFO)	3,740	Fishing, ice fishing, hunting, boating and water skiing, windsurfing, OHV, snowmobiling
Snake River Rim (SFO)	4,500	OHV, hunting, mountain biking, hiking, jogging, horseback riding, photography, bird watching, swimming
North Ketchum (SFO)	278	Fishing, biking, hiking, horseback riding, photography, picnicking, running events, cross country skiing
Bennett Hills (SFO)	650,000	Swimming, boating, OHV and snowmobiling, fishing, caving, hunting, camping, mountain biking, backpacking, horseback riding
Bald Mountain (SFO)	1,372	Alpine skiing and snowboarding
Thorn Creek (SFO)	2,000	Fishing, boating, hiking, hunting, camping
T-Maze Caves (SFO)	9,750	Caving
Cedar Fields (BFO)	2,300	Rock climbing, OHV
Cotterel Mountain (BFO)	40,967	Hunting, camping
Jim Sage Mountain (BFO)	11,227	Hunting, hiking, mountain biking
Milner (BFO)	2,055	Fishing, Oregon Trail, picnicking, boating
Raft River Crossing (BFO)	600	Oregon Trail
Salmon Falls Creek (BFO)	7,300	Nature study, solitude
Salmon Falls Reservoir	24,200	Fishing, camping, boating
Blackfoot River	16,000	Fishing, whitewater boating
Pocatello OHV	32,532	OHV use
Total SRMA Acres	**2,188,537**	

TABLE 3-35. ELIGIBLE SEGMENTS FOR FUTURE SUITABILITY STUDY FOR WILD AND SCENIC RIVERS DESIGNATION

Eligible Rivers	Field Office	Miles
Snake River (South Fork)	USFO	61.0
Bear River	PFO	11.1
Big Wood River	SFO	2.1
Blackfoot River	PFO	5.6
Box Canyon	PFO	1.2
Dry Creek	PFO	4.6
King Hill Creek	SFO	10.0
Snake River-Milner Section	BFO	8.5
Snake River-Murtaugh Section	BFO	13.0
Snake River-Hagerman or Wiley Section	SFO	7.2
Snake River-King Hill Section	SFO	12.8
Vineyard Lake	SFO	0.5
Total River Miles		**137.6**

3.10.1.4 Special Designations

There are five scenic byways and trails within the planning area: (1) the 68-mile Thousand Springs Scenic Byway along State Highway 30, from the town of Bliss to the Hanson Bridge; (2) the 116-mile Sawtooth Scenic Byway along State Highway 75, from the town of Shoshone to Salmon; (3) the National Scenic Trail segment of the Continental Divide Trail; (4) the City of Rocks Backcountry Byway; and (5) a 6-mile segment of the Continental Divide National Scenic Trail.

3.10.1.5 Off-highway Vehicles (OHVs)

OHV use within the planning area has increased substantially over the past few decades and is currently one of the more controversial issues on BLM-administered lands. Motorbike/All-terrain Vehicle (ATV) registrations in Southeast and South Central Idaho increased 149 percent from 1998 to 2003, and the BLM has identified OHV use as a national issue. BLM-administered lands within the planning area are designated as either open, limited, or closed to OHV use. The BLM's OHV designations are described below.

Open – The BLM designates areas as open for intensive OHV use where there are no compelling resource protection needs, user conflicts, or public safety issues to warrant limiting cross-country travel.

Limited – The agency designates areas as limited where it must restrict OHV use to meet specific resource management objectives. These limitations may include restricting the number or types of vehicles, limiting the time or season of use, limiting use to permitted or licensed use only, limiting use to existing roads and trails, and limiting use to designated roads and trails. The BLM may place other limitations, as necessary, to protect resources, particularly in areas that motorized OHV enthusiasts use intensely or where they participate in competitive events.

Closed – The BLM designates areas as closed if closure to all vehicular use is necessary to protect resources, ensure visitor safety, or reduce use conflicts.

3.10.2 RISKS

Wildland fire and human-controlled methods of vegetation management may affect the recreation setting character of the planning area through changes in the experience, setting, and activity opportunities of an area. Disruption or elimination of some recreational opportunities could occur with the proposed management activities by temporarily impeding accessibility to sites or affecting the aesthetic qualities of an area. Temporary hazards for recreationists may exist in areas that have recently burned. Initially, burned areas may also have less recreational appeal to the public. Conversely, areas with heavy deadfall density or dense vegetation may preclude or detract from recreational experiences.

3.10.3 OPPORTUNITIES

In the long term, reducing the impacts of large wildland fire would improve recreational opportunities by improving the areas that recreationists use. Hunters, hikers, and other recreationists would have the opportunity to experience natural systems that exhibit greater scenic and habitat diversity. Additionally, the long-term, fire-related risk to the health and safety of recreationists would be reduced.

3.11 WILDERNESS RESOURCES

3.11.1 CURRENT CONDITIONS AND TRENDS

Wilderness study areas (WSAs) are areas that the BLM has evaluated and determined to be suitable for wilderness, but do not yet have a formal Congressional wilderness designation. WSAs are managed to preserve their wilderness values and continue to be managed in that manner until Congress either designates them as wilderness or releases them for other uses.

There is no designated wilderness on BLM-administered lands in the planning area; although, the NPS and USFS administer the Craters of the Moon National Monument and Preserve and Sawtooth Wildernesses, respectively. Additionally, the planning area contains 31 WSAs, which the BLM manages, some of which share administration with other planning areas (Boise Planning Area or agencies [NPS, USFS]) (Figure 3-12; Table 3-36).

TABLE 3-36. WILDERNESS STUDY AREAS (WSAS) IN THE PLANNING AREA

WSA Name	Total Acreage
Appendicitis Hill (USFO)	21,900
Bear Den Butte (SFO)	9,700
Black Butte (SFO)	4,068
Black Canyon (USFO)	5,400
Black Canyon (SFO)	10,371
Burnt Creek (USFO)	3,250 (24,980 total)
Cedar Butte (USFO)	35,700
China Cup Butte (USFO)	160
Deer Creek (SFO)	7,487
Friedman Creek (SFO)	9,773
Gooding City of Rocks East (SFO)	14,743
Gooding City of Rocks West (SFO)	6,287
Great Rift1 (USFO, BFO, SFO)	380,200
Hawley Mountain (USFO)	15,510
Hell's Half Acre (USFO)	66,200
Henrys Lake (USFO)	350
King Hill Creek (SFO split with Boise District)	6,000 (29,309 total)
Lava (SFO)	23,680
Little City of Rocks (SFO)	5,875
Little Deer (SFO)	33,531
Little Wood River (SFO)	4,265
Lower Salmon Falls (split with Burley Field Office/Jarbidge Field Office)	1,800 (3,500 total)
Petticoat Peak (PFO)	11,298
Raven's Eye (SFO)	67,110
Sand Butte (SFO)	22,543
Sand Mountain (USFO)	21,100
Shale Butte (SFO)	15,968
Shoshone (SFO)	6,914
South Fork Snake River Islands (USFO)	770
White Knob Mountains (SFO)	9,950
Worm Creek (PFO)	40
Totals	**821,943**

3.11.2 RISKS

Without proactive fire management, current WSAs are at risk for loss of key ecosystem components. The potential encroachment of non-native invasive species into many WSAs in the planning area require care in the use of fire as a tool for resource benefit. Fire management procedures in WSAs must rely on the most effective methods that are the least damaging to wilderness values, other resources, and the environment.

3.11.3 OPPORTUNITIES

Because WSAs are selected for potential wilderness designation for possessing unique values inherent to wilderness, the benefits of implementing fire management direction would further enhance WSAs by restoring fire to its historical role and reducing the overall risk of the loss of key ecosystem components.

3.12 VISUAL RESOURCES

3.12.1 CURRENT CONDITIONS AND TRENDS

3.12.1.1 General Conditions

Allowing or suppressing wildland fire and using RxFire and other vegetation treatments may affect visual resources. Smoke and visible on-the-ground activities are two direct impacts to visual resources resulting from fire and vegetation management activities that need to be considered. The landscape within the planning area that could be affected by wildland fire, and fire vegetation treatments exhibits an extraordinary range of visual diversity, as described below.

The Basin and Range province, located roughly in the southeastern portion of the planning area and south of the Snake River Plain, is characterized by a series of rugged northwest-southeast-trending mountains and flat valleys. As seen from a distance, the landscape, with vegetation comprising primarily shrubs, presents a uniform appearance broken by pinyon-juniper on the mountain slopes.

The Columbia Plateau, of which the Snake River Plain is a part, lies along the central and western portions of the planning area and is typified by geologically ancient and recent lava flows. Steep-sided extinct volcanoes, cinder cones, sand dunes, and widely spaced mountains occasionally interrupt and provide a visual contrast to the relatively flat landscape. As seen from a distance, the views of the area present an essentially natural, undeveloped landscape composed of distinct light-dark contrasts between the vegetation and volcanic rock.

The small portion of the Middle Rocky Mountain province lies within the southeastern corner of the planning area, and includes the northern portion of Bear Lake. This area is characterized by rugged, mountainous terrain (Stokes 1986). The Northern Rocky Mountain province lies along the northern boundary of the planning area, and like the Middle Rocky Mountain province, can be characterized as an area of high, rugged, glaciated mountains. Variations in topography and vegetation in this physiographic province tend to create strong visual contrasts sought out by sightseers and other recreationists. Spruce and fir forests at upper elevations are gradually replaced by aspen and pine at lower elevations; aspen and pine are, in turn, replaced further downslope by woodlands and grasslands. Numerous snow-covered or dark, deeply incised bare rock peaks are visible, and deep, sheer-sided river gorges and glacier-carved valleys wind through the mountains. This diversity of topography, vegetation, and geological formations characteristic of the area provides a variety of scenic experiences to those who live, work, or recreate in the area.

The BLM uses a Visual Resource Management (VRM) system to inventory and manage visual resources on BLM-administered lands. The primary objective of VRM is to maintain the existing visual quality throughout the planning area and to protect unique and fragile resource values. The VRM system uses four classes to describe the different degrees of modification allowed to the landscape. VRM classes are visual ratings that describe an area in terms of visual quality, viewer sensitivity to the landscape, and the distance in which a viewer would observe an area. Once an area has been assigned a VRM class, the class can be used to analyze and to determine the visual impacts of proposed activities on the land and to gauge the amount of disturbance an area can tolerate before it exceeds the visual objectives of its VRM class (BLM 1980).

VRM classes are assigned to areas within the planning area through the resource management plan (RMP) process, and the assignment of VRM classes is ultimately based on the management decisions made in the RMPs. Interim VRM classes are established where a project is proposed and there are no RMP-approved VRM objectives. These classes must conform to the land-use allocations set forth in the RMP that covers the planning area and are assigned using the guidelines and management objectives for VRM Classes I through IV. The BLM's VRM classifications and objectives are defined in Appendix M. Table 3-37 lists the number of acres within the planning area that are managed under the visual objectives and restrictions of each VRM class.

TABLE 3-37. APPROXIMATE ACREAGES OF THE PLANNING AREA WITHIN EACH VISUAL RESOURCE MANAGEMENT (VRM) CLASS

VRM Class	Acreage
I	471,617
II	698,346
III	1,517,420
IV	2,320,373
Total Acres	**5,007,756**

Source: BLM 2002b

3.12.1.2 Key Observation Points (KOPs)

As describe above, the BLM uses the VRM system and the four VRM classes to analyze and to determine the visual impacts of proposed activities on the land and to gauge the level of disturbance an area can tolerate before it exceeds the visual objectives of each VRM class. The method that the BLM uses to determine whether proposed projects conform to approved VRM class objectives is a contrast rating system that evaluates the effects of proposed projects on visual resources.

Contrast rating is done from critical viewpoints, known as KOPs, which are usually along commonly traveled routes or other points of view visible to people. A KOP can either be a single point of view that an observer/evaluator uses to rate an area or panorama, or a KOP can be a linear view along a roadway, trail, or river corridor. Six factors are considered when selecting KOPs: (1) the angle of observation or slope of the proposed planning area, (2) the number of viewers of the planning area, (3) the length of time that the project is in view, (4) the relative size of the project, (5) the season of use, and (6) light conditions. The evaluator rates the degree of visual contrasts based on form, line, color, and texture changes between the existing landscape and how the landscape would look after project disturbance. The contrast ratings can then be used to determine whether the level of disturbance associated with the proposed project would exceed the VRM objectives for that area (BLM 1986).

The primary public views of fire suppression, RxFires, and Rx vegetation treatments described in the alternatives would be from major travel routes, urban/public land boundary areas, and recreational use areas within the planning area. KOPs were selected to represent the effects of vegetation treatment on these highly visible areas. These areas were selected using the selection criteria described above. Each KOP is described in detail below (Figure 3-13).

3.12.1.2.1 KOP 1: Pocatello Creek Urban Boundary

This KOP is on an improved dirt road that overlooks Pocatello Creek, located on the north side of Pocatello Creek Canyon within the Pocatello metropolitan area. Views to the east are up the steep-sided canyon and include houses and heavily wooded canyon slopes in the foreground and middleground, and distant views of the Pocatello Range. The view to the south shows numerous houses, power lines, paved and unpaved roads in the middle and background, canyons and hillsides heavily vegetated with juniper and sagebrush in the middleground and background, and scrub oak and maple in the background.

3.12.1.2.2 KOP 2: Appendicitis Hill WSA

This viewpoint is on the shoulder of U.S. Route 93, approximately 2 miles north of the town of Moore. The WSA is a VRM Class I area and lies along a major thoroughfare used by travelers and recreationists to access the Pioneer and Lost River Ranges. Views to the west are of irrigated fields in the foreground and middleground, gently rolling hills in the middleground, and moderately steep slopes in the background. The sagebrush vegetation texture and color are relatively uniform, interrupted by occasional rock outcrops. The view to the northwest contains farmhouses and power lines in the middleground, and more rocky outcrops in the background.

3.12.1.2.3 KOP 3: Ohio Gulch

This viewpoint is located approximately one-quarter mile east of State Route 73, north of the town of Hailey. The views to the south and west are of flat to steep hillsides, heavily vegetated with sagebrush and grasses and interspersed with juniper in the foreground, middleground, and background. The view to the west includes an improved dirt road, buildings in the middleground, and background views of steeply sloped mountains. The northern view contains steeply sloped foreground and middleground hillsides of sagebrush occasionally interrupted by rock outcrops. The steep terrain to the north obscures the background views.

3.12.2 RISKS

Public perception of fire and burned areas has traditionally been negative because burned areas have less visual appeal to the public for a short time following the fire. However, as the public becomes more educated on the role of fire in natural ecosystems this perception could change. Short-term impacts from smoke on scenic values may increase as a result of WFU, as well as impacts from mechanical and chemical treatments.

3.12.3 OPPORTUNITIES

Modifying the landscape during vegetation management activities and altering color, line, form, and texture could impact existing visual resources as treatments are made to move to more desirable FRCCs. However, long-term expectations would result in a visual landscape that resembles historical fire conditions with correspondingly smaller and less obtrusive burnt areas, and a more heterogeneous vegetation mosaic.

3.13 CULTURAL RESOURCES

3.13.1 CURRENT CONDITIONS AND TRENDS

The BLM is responsible for identifying, protecting, preserving, managing, and enhancing archaeological, historical, architectural, and traditional values located on BLM-administered lands, as well as those that might be affected by BLM undertakings on non-federal lands. The planning area cultural resources program manages archaeological remains, historical values, and traditional lifeway values important to Native Americans. Tribal cultural resource staff/representatives may also contribute significantly through historic and traditional knowledge and information.

3.13.1.1 Cultural Resource Inventories

Cultural resources are generally identified through field inventories conducted by qualified professionals to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966. Historical records, ethnographic studies and consultation with tribes are also used to identify known or potential archaeological, historical, and traditional values. Three types of inventories—Class I, Class II, and Class III (see Glossary definition: cultural resource inventory) are conducted to identify and assess these values on BLM-administered lands. Class I inventories for the planning area have not been completed. Class III inventory is the most common inventory type used when complying with cultural resource identification requirements under Section 106 of the NHPA of 1966, as amended, and typically consists of a 100 percent bounded area and a (thorough) pedestrian inventory associated with a specific proposed project. Only approximately 10 percent of planning area lands have been subjected to Class III inventories: about 168,000 acres of the USFO, 22,500 acres of the PFO, 60,000 acres of the BFO, and 80,000 acres of the SFO.

3.13.1.2 Prehistoric Sites and History of Settlement

Despite the small percentage of lands that have been inventoried for cultural resources, approximately 9,100 sites have been documented within the planning area. These sites represent a variety of types and chronological periods, dating from at least 11,000 years old to the present. Identified prehistoric sites include lithic scatters, quarries, rockshelters, rock structures and piles, and pictographs/petroglyphs.

Historical sites include homesteads, railroad and trail corridors, agricultural or ranching sites, debris scatters, inscriptions, and other manifestations of historical exploration and occupation. The first European presence in the area was by fur trapping and exploratory expeditions in the early 1800s. The main route of the Oregon Trail, as well as several alternate routes (North Side Alternate, Goodale Cutoff, Lander Trail, Hudspeth Cutoff, and Nez Perce Trail) cross the planning area. During the early days of Euro-American settlement in southern Idaho, sheep and cattle grazing were the predominate economic pursuit in this area. Sheepherder camps, cairns, and dumps are common. Settlers were attracted to the rich soils on the broad bench and bottom lands along the Snake River and began farming the area in the mid-1800s. Irrigation operations to support larger agricultural pursuits began in the late 1800s. Silver, gold, and lead mining also took place in adjacent mountain ranges beginning in the 1860s. All of these activities have left their mark as archaeological sites across the planning area landscape.

3.13.1.3 Cultural Resources Conditions and Trends

Cultural resources conditions and trends within the planning area vary considerably due to the variability of terrain and geomorphology, access and visibility, and past and current land use. Exposed artifacts and features on the ground surface can be disturbed by elements such as wind and water erosion, animal and human intrusion, and development and maintenance activities. 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.

3.13.2 RISKS

Several potential effects on cultural resources related to fire include: (1) artifacts/sites can be physically damaged by heat; (2) artifacts/sites can be damaged or buried by fire suppression activities; (3) artifacts/sites can be exposed by removal of vegetation, making them more obvious to agency resource specialists or the general public; and (4) artifacts/sites can be damaged or buried by rehabilitation methods (e.g., seeding by drilling or chaining) that result in soil surface disturbance. Normally, the Resource Advisor is aware of these risks and can take proactive measures to greatly reduce or eliminate these impacts to Cultural Resources.

3.13.3 OPPORTUNITIES

A fire event (either wildland fire, WFU, or RxFire) provides an opportunity for intensive cultural inventories to identify cultural resources in a given area. In the case of wildland fire and WFU, field inventories are generally conducted to identify and assess sites within the burned area prior to rehabilitation efforts should they be proposed. In the case of RxFire, pre-burn inventories are conducted to assess the potential impacts of fire on resources that are present in the area. Other types of treatments could reveal previously unknown cultural sites, providing important historical information to the public and/or the tribal governments.

3.14 NATIVE AMERICAN TRIBAL CONCERNS

3.14.1 CURRENT CONDITIONS AND TRENDS

Regarding Shoshone-Paiute Tribal interest in these lands, the Boise Valley Treaty and the Bruneau Valley Treaty were never ratified. The Tribes believe that the title was not relinquished and they continue to claim title, rights and interests associated with these lands. The BLM recognizes the traditional use associated with the lands as well as the requirements of cultural resource laws. The planning area now includes portions of the traditional lands of the Shoshone-Bannock and Shoshone-Paiute Tribes (Hultkrantz 1974; Murphy and Murphy 1986; Thomas et al. 1986). Federally recognized tribal governments have rights to and/or legal interests in public lands administered by the BLM. Both Tribal Governments depend upon the lands for a myriad of uses. The lands retain social, economic and traditional value for the tribal people, as well as contemporary and ongoing spiritual and cultural uses. Through consultation with the Tribal Governments, the BLM is aware of their treaty/trust obligations and the tribes' desire to capitalize on opportunities that maintain or enhance resources critical to the exercise of treaty rights, traditional customs, subsistence, and cultural uses of the land.

The Shoshone-Bannock Tribes have treaty rights under the Fort Bridger Treaty of 1868 that extend to unoccupied federal lands off-reservation. Reserved treaty rights typically include hunting, fishing, erecting of curing structures, trapping, and gathering. The Shoshone-Bannock Tribes also retain pasturing (grazing) rights on ceded lands around Pocatello. The current reservation includes 544,000 acres in southeast Idaho. The Tribal Government is headquartered in Fort Hall, Idaho. The Tribes derive income from leases (business and land), mineral rights, and some agriculture. There are a number of tribal industries, and grazing permits also provide income to the Tribes. The Tribes are extremely interested in protecting the public lands and resources related to the exercise of their reserved treaty rights, as well as cultural resources, subsistence, spiritual, and traditional uses.

The Duck Valley Indian Reservation is the Shoshone-Paiute Tribes' current reservation includes 294,242 acres in Idaho and Nevada. The reservation is headquartered in Owyhee, Nevada, and the Tribal Government is housed there. The principal revenue sources of the Tribal Governments are farming and ranching. Businesses owned and managed by Tribal members, and grazing permits also provide income to the Tribes. Like most reservation communities, the area is geographically isolated and economically depressed. The people are tied traditionally, culturally and spiritually to the land, and they are very interested and involved in helping to shape how the lands and the resources are administered by the BLM. The Shoshone-Paiute Tribal Government is particularly concerned about cultural resources on public land, as well as subsistence, spiritual, and traditional use areas.

The BLM is obligated for maintaining a formal government-to-government relationship with federally recognized tribal governments. The Shoshone-Bannock Tribal Governments and Shoshone-Paiute Tribal Governments have both rights to and cultural/historical affiliation with the lands in the planning area (Figure 3-14). The relationship between the federal government and these Tribal Governments focuses on ensuring the legal rights and/or interests of the Tribal Governments are protected and preserved in accordance with relevant treaties, executive orders, legislation, the U.S. Consitution and federal policies. This includes consulting with tribal representatives; identifying and protecting important archaeological, religious, and/or sacred sites; and providing tribal members with appropriate access to these sites.

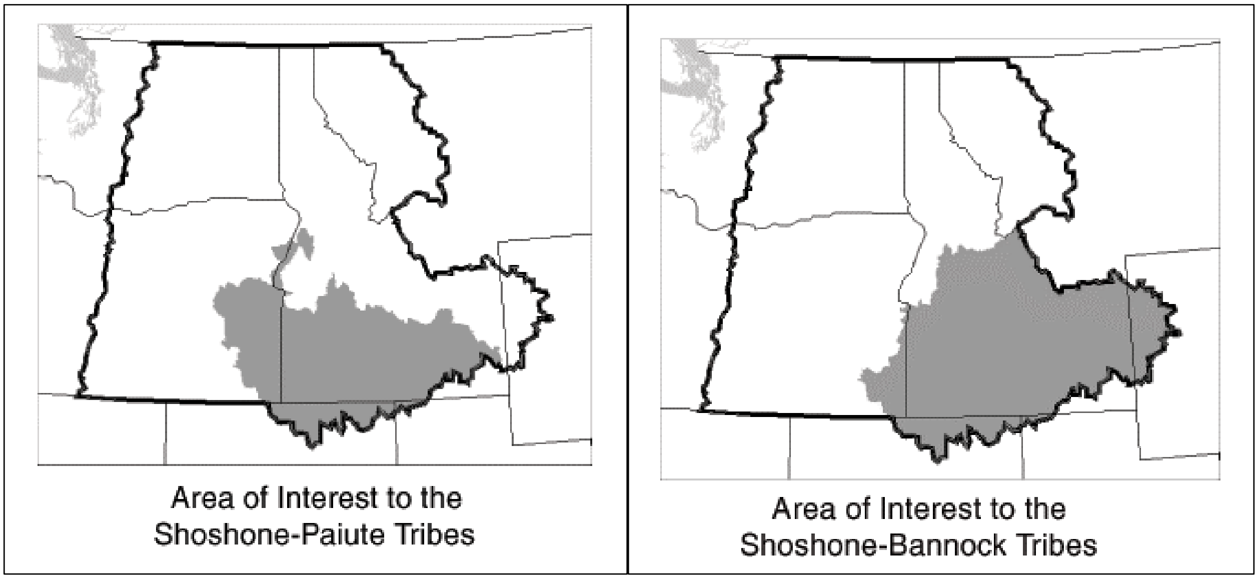

Figure 3-14. Areas of interest to local Tribal Governments.

In addition to ensuring maintenance of tribal treaty rights granting access to public lands within the planning area, the BLM is required under the Native American Graves Protection and Repatriation Act (NAGPRA) law to ensure the protection and proper treatment of human remains of Native American origin known to be present or discovered on lands under their jurisdiction. NAGPRA mandates that land managers consult with affiliated tribes to assign cultural patrimony of affiliation to human remains found as part of a federal undertaking and consult with the affiliated Tribes to arrange for repatriation of the remains, associated funerary objects and other objects. The BLM has a policy adhering to the NAGPRA legislation and requiring that in the event of an inadvertent discovery of Native American remains during an undertaking, including activities related to implementation of fire management plans (FMPs), all work in the area of the discovery would cease immediately and would remain halted until such time as the appropriate tribal governments have been contacted and consultation according to NAGPRA has taken place. Current guidance allows for NAGPRA materials encountered during the course of disturbance activities to be reburied as close as possible to the site, rather than being excavated.

3.14.2 RISKS

Consultation has been undertaken between the BLM and the tribal governments regarding concerns over implementing the proposed plan amendment that would result as a process of this

EIS. To date, no issues have been identified, nor have sites within the planning area been officially documented and/or designated as traditional cultural properties or sacred sites through the Section 106 process.

3.14.3 OPPORTUNITIES

The Districts would continue to work with the Tribal Governments throughout the EIS process, other planning efforts, and on specific projects. Formal consultation would be conducted pending the identification of issues or sites.

3.15 SOCIOECONOMICS

3.15.1 CURRENT CONDITIONS AND TRENDS

The planning area encompasses a portion of Idaho with a socially diverse population and a broad economic base. While the diversity is evident, a common characteristic that binds this region is its rural nature. Out of 23 counties in the planning area, 20 are considered rural. In the State of Idaho, a county is defined as rural if there are no cities of 20,000 or more in population. According to this definition, all but three counties – Bonneville (Idaho Falls), Bannock (Pocatello), and Twin Falls (Twin Falls) – are rural. Each urban county, however, also has very rural areas that share characteristics with neighboring counties. Rural areas hold the majority of the state's natural resources. Abundant natural resources in rural areas define the important relationship between BLM-administered land management and the socio-economic condition of a region. The causal effect of decisions made on BLM-administered lands would be much greater in regions with more BLM-administered land and may affect social, economic, and governmental settings.

3.15.1.1 Social Setting

The planning area encompasses approximately one-third of the State of Idaho. The following twenty-three counties are within the planning area:

Bannock	Camas	Fremont	Minidoka
Bear Lake	Caribou	Gooding	Oneida
Bingham	Cassia	Jefferson	Power
Blaine	Clark	Jerome	Teton
Bonneville	Elmore	Lincoln	Twin Falls
Butte	Franklin	Madison	

3.15.1.1.1 Population Characteristics

According to the 2000 Census, the total population of the Snake River region is 467,287, which is 36 percent of the total population of Idaho (1,293,953). Of the regional population, nearly 137,000 of this number live in three urban areas: Pocatello, Idaho Falls, and Twin Falls.

3.15.1.1.2 Population Trends

Between 1990 and 2000, the Snake River Region grew by 16 percent, less than in the State of Idaho overall, which grew by 29 percent. Major growth in the last decade occurred mostly in Teton County (74 percent), Blaine County (40 percent), and Camas County (36 percent). Even with strong statewide and regional growth, some counties only grew minimally, or not at all. Butte County actually decreased in size, down 0.7 percent. Minidoka and Caribou counties grew less than 5 percent.

3.15.1.1.3 Population Growth and Urbanization

Population density in the counties within the planning area is increasing. Between 1990 and 2000, the population per square mile increased from 15.4 to 18.0. However, rural areas decreased by 1.2 percent, down from 66.2 percent to 65.0 percent. In 1990, the region was 33.8 percent urban, increasing to 35.0 percent in 2000. Between 1990 and 2000, Butte, Camas, and Clark, Lincoln, Oneida, and Teton counties saw no change and remain 100 percent rural. Other counties saw increases in urbanization, including Gooding (16 percent increase) and Twin Falls (6 percent increase) (Idaho Department of Commerce 2003).

Urbanization trends are most noticeable in existing urban areas, where the historical urban growth boundaries are being pushed further into undeveloped areas. The City of Pocatello, for example, has seen rampant growth in its foothills and adjacent to BLM-administered lands, placing pressure on communities for infrastructure and services. In Idaho Falls, agricultural farmland is being lost as these lands are being developed for housing. Although not considered an existing urban area, the communities of Driggs, Victor, and Tetonia in Teton County have seen 56 percent growth (U.S. Census Bureau 2000). Throughout the Upper Snake River planning area growth is noticeable as it pushes the urban limits of existing towns and spreads to visible foothills and adjoining agricultural farmland. Urbanization would require careful attention from managers, who would be faced with the challenge of balancing developed property and wildland fire.

3.15.1.1.4 Housing

The amount of seasonal housing in a county or community can reflect the type of economy it relies on. A large number of seasonal housing units reflect an economy can indicate a dependency on recreation and tourism. The following counties have a high proportion of seasonal housing:

- Fremont – 34 percent
- Blaine – 31 percent
- Clark – 24 percent
- Camas – 23 percent
- Bear Lake – 22 percent

Region-wide, homes are 88 percent occupied. Higher vacancy rates occur in areas with more seasonal housing and include the counties of Fremont (44 percent), Blaine (36 percent), Clark (35 percent), Camas (34 percent), and Bear Lake (31 percent) (U.S. Census Bureau 2000).

The median value of homes in the region is $105,752, comparable with the state average of 106,300. The highest home values are in Blaine ($288,000), Teton ($133,000), and Madison

($106,800) counties. The lowest median home value is in Clark ($64,600), Butte ($68,700), and Bear Lake counties ($72,600) (U.S. Census Bureau 2000).

3.15.1.2 Economic Setting

The major economic sectors that could be affected by fire management policy include the agriculture, tourism, government services, and retail trade services.

3.15.1.2.1 Agriculture and Grazing

A large proportion of industry is tied to land use. According to the Idaho Department of Commerce (2003), one-half of all land in the region (51 percent) is considered rangelands. The second highest land use is agricultural lands (25 percent). Counties with a high proportion of rangelands include:

- Blaine – 61 percent
- Butte – 65 percent
- Camas – 59 percent
- Caribou – 67 percent
- Cassia – 68 percent
- Clark – 76 percent
- Gooding – 53 percent
- Oneida – 64 percent
- Twin Falls – 68 percent

Jerome and Madison counties have a high proportion of agricultural lands with 52 percent and 67 percent, respectively (Table 3-38). A total of 8 percent of the region is considered urban land, reflecting the rural nature of the State of Idaho. A majority of the counties within the study are largely agricultural. Although agriculture may be a dominant land use, employment data suggests that it may not be the primary occupation of landholders.

Many of these counties also have a high proportion of BLM-administered lands, which indicates that management decision on BLM-administered lands would have a higher impact to farming and ranching communities with respect to social and economic settings.

3.15.1.2.2 Tourism

As noted in the introduction, rural counties typically have a high proportion of BLM-administered lands that often serve as recreation areas. Recreation is a high tourism draw in Idaho, as well as in the region. Fremont, Teton, and Blaine counties have high lodging sales per capita, high tourism-related employment, and a large portion of their housing stock classified as seasonal or recreational. Tax receipts for travel and tourism related services for Blaine County totaled over $635,000, significantly higher than the regional average of approximately $85,000. Fremont and Bonneville counties are all also well above the regional average (Idaho Department of Commerce 2003).

3.15.1.2.3 Government Services

Government services are most important in the following counties: Fremont, Butte, Camas, Lincoln, Oneida, and Bear Lake counties. The INL is a large presence in Butte County (Idaho Department of Commerce 2003). The INL covers 571,000 acres (893 square miles) in a rural, sparsely populated sector of southeastern Idaho. The eastern boundary is 23 miles west of Idaho Falls. The INL also occupies numerous buildings and laboratories located in the City of Idaho Falls.

TABLE 3-38. AGRICULTURAL DATA FOR THE PLANNING AREA

	Total # Farms	Total Acres in Farms	Average Farm Size	Total Acres in Crops	Cattle and Calf Inventory
Bannock	664	309,281	466	166,700	23,795
Bear Lake	410	221,717	541	121,299	32,274
Bingham	1,168	796,065	682	377,753	81,747
Blaine	195	214,985	1,102	70,233	26,849
Bonneville	787	449,426	571	312,093	44,171
Butte	207	129,639	626	70,355	20,193
Camas	98	127,514	1,301	79,958	7,445
Caribou	427	469,381	1,099	265,388	31,540
Cassia	729	656,658	901	378,150	138,686
Clark	83	215,301	2,594	no data	15,758
Franklin	655	246,127	376	148,431	43,953
Fremont	493	334,151	678	193,394	24,517
Gooding	675	220,362	326	no data	140,974
Jefferson	773	332,535	430	234,334	62,730
Jerome	683	193,921	284	159,852	133,648
Lincoln	281	131,473	468	no data	36,422
Madison	470	222,817	474	174,147	16,302
Minidoka	674	206,882	307	no data	33,817
Oneida	387	271,108	701	187,730	23,233
Power	323	424,085	1,313	354,392	35,933
Teton	270	132,678	491	101,862	15,683
Twin Falls	1,439	456,378	317	308,139	126,184
Planning Area Average	**510**	**293,327**	**708**	**160,796**	**49,639**

Source: U.S. Census Bureau 2000.

3.15.1.2.4 Retail Trade Services

Retail trade and diversified trade and service centers include Bannock, Bonneville, Madison and Twin Falls counties (Idaho Department of Commerce 2003). Most often retail trade centers are in major cities that serve as economic centers for a region.

3.15.1.2.5 Economy of Fire Management

Costs and allocations for current fire management operations for the planning area are shown below. Costs are representative of annual fire operations for 2002 (Table 3-39 and 3-40). A total of $10 million dollars for restoration efforts was spent in 2002. Approximately 80 percent of the work completed under this program is contracted to local and regional companies and services. Specifically, the money was spent as follows:

- 50 percent - On the ground treatment.
- 35 percent - Community Programs, including WUI. WUI includes local community programs for monitoring, education, prevention, planning, weed control, and home inspections. Additional money is allocated for community assistance agreements.
- 15 percent - Fixed wages (BLM 2003).

TABLE 3-39. CURRENT FIRE TREATMENT COSTS PER ACRE IN THE PLANNING AREA, AS OF 2002

Fire Treatment	Approximate Cost Per Acre	Details
Restoration with RxFire	$105	$20/acre to burn, $40/acre to reseed, other costs associated. Typically, variable costs for RxFires decrease.
Fire Suppression for Wildland Fire	$140	This number is averaged between large and small fires.

Source: BLM 2003.

TABLE 3-40. CURRENT FIRE MANAGEMENT OPERATIONS IN THE PLANNING AREA

Approximate Dollar Amount	Description	Estimated Contribution to Local/Regional Economic Base
6 Million	Fixed labor costs to run the fire program	Salaries to local/regional population.
10 Million	Fire related costs including additional variable costs. This number fluctuates each year depending on the number and extent of fires. This number includes food, gas, maintenance, motels vehicles, administrative costs, warehousing, fuels, and seeding. Seeding alone was 1.7 million in costs in 2002.	Approximately 70% of services are locally based (7 Million).
4 Million	Other suppression costs including intangible services such as additional crews, planes or national resources devoted to fire.	Approximately 25% of services are locally based (1 Million). Specifically, Indian population is employed on fire crews.

Source: BLM 2003.

Table 3-41 reflects receipts from three separate funds for the FY in 2002. Grazing fees are collected in two separate funds. From the 715 Fund, 50 percent of the revenue is paid back to the state. From the 720 Fund, 12.5 percent is paid back to the state. A timber fund pays 4 percent of receipts back to the county or state.

TABLE 3-41. GRAZING AND TIMBER RECEIPTS IN THE PLANNING AREA, FISCAL YEAR (FY) 2002

Fund	Receipts	Highest Producing Counties
Grazing - 715	$30,532	Caribou, Bear Lake
Grazing - 720	$524,668	Cassia, Lincoln, Clark, Oneida, Custer, Twin Falls
Timber - 750	$1,458	No major producers compared with State

3.15.2 RISKS

By continuing existing fire management policies, several socio-economic conditions could be affected.

- WUI - the risk to the WUI would likely increase due to increased growth and continued high risk of frequent and/or large fire.
- Grazing - existing fire management policies could result in long-term adverse impacts to grazing allotments through frequent and/or large burning combined with continued invasion of Invasive Annual Grass.
- Tourism - tourism areas rely heavily on scenic character. If frequent large fires continue, adverse impacts to visual resources, and consequently, scenic character, would adversely affect the tourist economy.

3.15.3 OPPORTUNITIES

By changing fire management policies, expanded opportunities may be possible for:

- Housing – fire risk may be reduced for houses in fire-prone areas if fire suppression and fuels management is increased through future actions of the BLM and coordination with municipalities.
- Urban growth boundaries – revised fire management policies and coordination with municipalities could be used to control urban growth on benches, hillsides, or other WUI.
- Grazing allotments – managed under new fire and fuels management policies, grazing allotments could potentially return as better long-term grazing allotments as FRCC improves.
- Cost of fire suppression – this cost could decrease with more treatments and less wildland fire as FRCC improves.

- Changed fire management policies – these would maintain or improve vegetative resources. As this resource is improved, land uses such as recreational activities would increase as well. Tourism tied to these lands could increase, thus providing increased economic benefit to counties.
- FRCC – If FRCC is improved, quality of life could increase with a decrease in visible smoke, increased safety, and increased or preserved recreation opportunities.