Chapter 3
Affected Environment

A Personal View

Bend, fold, spindle, and/or mutilate!

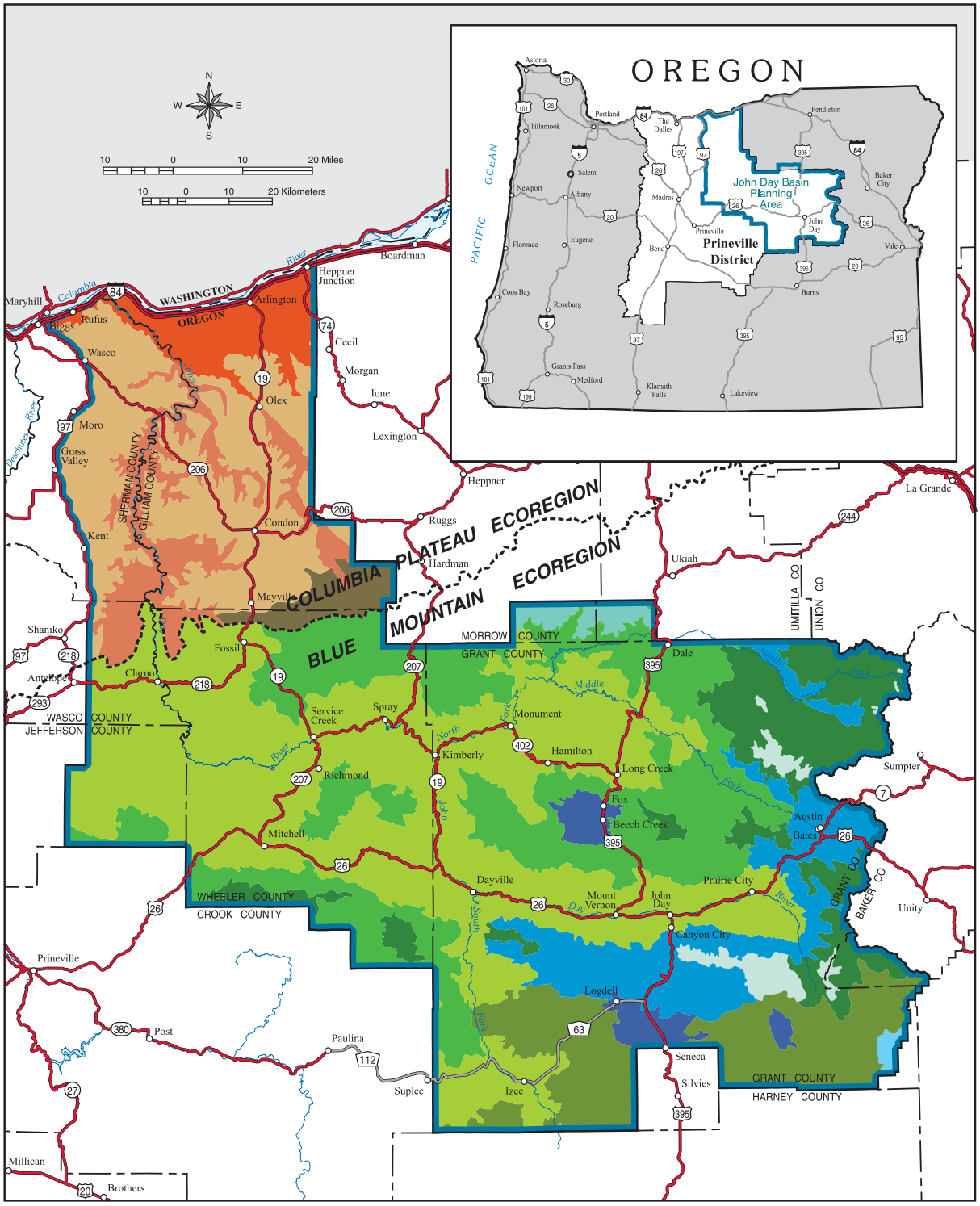
A Journey through Time is the name of a scenic motor route through the heart of the John Day basin. It is a neck wrenching drive because in the spring one's vision is constantly redirected from the greenish gray water of the river flowing past brilliant green fields to pastel colored slopes covered by grass or brush or barren clays to layer upon layer of red to chocolate covered basalt. Once, approaching Picture Gorge my passenger became nervous because, as I was driving, I was counting obvious layers of rock the river had spindled through—11, 12, no 14 then I was certain that I had noted 17 layers. Besides making my passenger nervous there was a logical reason for doing this. Time! How much time was taken to create each layer? These were created as rapidly as it took for lava to spread across the landscape. Bracketing these thick rapidly created layers are sedimentary layers created over many millennia by dead things such as leaves, sticks, palm trees, and the remains of creatures ranging from microscopic sea creatures to extremely large prehistoric rhinoceros. Caps of volcanic ash spewed by ancient volcanoes separated these layers and, not inconsequently, frequently preserved the remains of plants and animals that no longer exist.

Today's landscape is the result of a contest between land building processes and degradation processes. Land building includes the introduction of flow after flow of lava, the deposition of dead plants and animals and other sediments, the drifted ash from violent volcanic eruptions, and the physical forces that have bent, folded, and mutilated the layers created by the other processes. These physical forces are caused by the shifting of huge plates of rock deep below the surface of the earth, usually at rates much slower than we can perceive. The occasional earthquake is evidence of brief periods of rapid movement as these plates slip across each other. The bending, folding and mutilating of the strata created by the other land building processes do crazy things to the sensible layering process.

The National Park Service staff at the Thomas Condon Paleontology Center has published a diagram of the sedimentary and igneous layers in this area (http://www.nps.gov/joda/naturescience/john-day-strata.htm). If these strata are measured as originally deposited above the lowest layer (the Goose Rock stratum), they are over three miles thick. However, shifts deep below the surface have tilted, bent and folded them. As a result, our view of the strata is distorted (made visible through erosion by the John Day River). For example, the uppermost layer is "only" 3,000 vertical feet above the lowest Goose Rock stratum, visible just a few miles downstream from Picture Gorge. Also, Sheep Rock, about 1,100 feet above the John Day River is capped by a few layers of basalt. However, one mile south in Picture Gorge, basalt flows are layered to about 800 feet above the river and the bottom layers near the river correspond to the "cap layer" on Sheep Rock. The tilting of the strata explains why the three miles of thickness results in only 3,000 feet of elevation gain—the thickness of a layer is actually better measured in many places by measuring the actual distance between the beginning and end of a layer rather than the vertical thickness. So if one measures from Goose Rock to the top layer on the crest to the immediate east you get a little over 3 miles.

Layers visible near the National Monument do not necessarily exist throughout the planning area. What is important to remember is the general process. What is common throughout the planning area is a process that involves building up through a combination of volcanism and sedimentation; bending, folding and tilting resulting from the movement of underlying plates; and the process of erosion initiated by water moving gently at first and then rushing down rivers and streams within the planning area.

As a result of this process the landform of the planning area has developed and continues to change. The variations in landform provide conditions for the development of varying combinations of plants and animals. On the broadest scale these areas have been referred to as Ecoregions. The planning area falls within two broadscale ecoregions, the Columbia Plateau and the Blue Mountains. These ecoregions are further broken into subecoregions that reflect variations in elevation and other topographic variables.



LEGEND

- Planning Area Boundary
- Oregon Level Three Ecoregions

Columbia Plateau Ecoregion

- 10c - Umatilla Plateau
- 10e - Pleistocene Lake Basins
- 10k - Deschutes / John Day Canyons
- 10n - Umatilla Dissected Uplands

Blue Mountains Ecoregion

- 11a - John Day / Clarno Uplands
- 11b - John Day / Clarno Highlands
- 11c - Maritime-Influenced Zone
- 11d - Melange
- 11h - Continental Zone Highlands
- 11i - Continental Zone Footlands
- 11l - Mesic Forest Zone
- 11m - Subalpine - Alpine Zone
- 11o - Cold Basins

Map 17: Environmental Protection Agency Ecoregions

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

PRINEVILLE DISTRICT

John Day Basin
Resource Management Plan
Draft Environmental Impact Statement
2008

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Introduction

The following pages describe in more detail the geologic history and the characteristics of ecoregions and subecoregions within the planning area. This information provides the foundation for understanding the plant and animal communities within the planning area; why people live, work, and play here; and how the natural resources are affected, used, and valued by residents and visitors described in the balance of the chapter.

Ecoregions

At first sight, the John Day Basin does not seem to change much. The river, green fields, pastel hills, brown rimrock, and gentle mountains alter so slowly they don't seem to change at all. This illusion dispels us when the earth suddenly moves beneath us in an earthquake, a landslide covers the road, or the river rapidly covers the valley in a flood. Other processes are hidden deep in the earth, slowly forming rocks by the inch. These changes are the heart of the John Day Basin landscape.

The weather changes the landscape, too. Rains soak it in the fall, snow blankets it in the winter, and intense thunderstorms chew it up in the summer.

Combinations of landscape and climate create different Ecoregions. About 77% of BLM lands within the John Day Planning Area fall within the Blue Mountains while about 23% of BLM lands within the planning are within the Columbia Plateau Ecoregions. To better understand the planning area we will look at these two Ecoregions, as well as Level 4 or "SubEcoregions" on the next few pages (see Map 17: EPA Eco Regions and following Table 3-1). Over 60 percent of the BLM land is within a single subecoregion, the John Day/Clarno Uplands, part of the Blue Mountain Ecoregion. The eco and subeco regions are described below in a roughly north to south direction.

Table 3-1. Ecoregion Acres

Ecoregion	Subecoregion	BLM Plan Area Acres
Columbia Plateau	Pleistocene Lake Basins	12,603
	John Day Canyons	79,319
	Umatilla Plateau	10,351
	Umatilla Dissected Uplands	885
Blue Mountains	John Day/Clarno Uplands	275,983
	John Day/ Clarno Highlands	56,440
	Maritime-Influenced Zone	2,503
	Cold Basins	40
	Melange	8,559
	Subalpine-Alpine Zone	45
	Mesic Forest Zone	561
	Continental Zone Highlands	8,678
	Continental Zone Foothills	184

Columbia Plateau Ecoregion

The Columbia Plateau Ecoregion, which covers about 32,100 square miles, occurs in portions of Idaho, Oregon, and Washington. About 20 percent of the planning area (6,630 square miles) is within this Ecoregion. The Oregon portion of the Ecoregion extends from the eastern slopes of the Cascades Mountains, south and east from the Columbia River to the Blue Mountains. The centerpiece of this Ecoregion, the Columbia River, has greatly influenced the surrounding area with cataclysmic floods and large deposits of wind-borne silt and sand. Over time, winds scoured the floodplain, depositing silt and sand across the landscape and creating ideal conditions for agriculture: rolling lands, deep soil, and plentiful flowing rivers including the lower stretch of the John Day River. The Ecoregion is made up entirely of lowlands, with an arid climate, cool winters, and hot summers.

The Columbia Plateau produces the vast majority of Oregon's grain and has the second highest agriculture sales per year for any ecoregion in Oregon. More than 80 percent of the Ecoregion's population and employment is located in the Umatilla County which includes Pendleton and Hermiston. Other population centers include The Dalles, Condon, and Heppner. Almost all of the Columbia Plateau Ecoregion is privately owned (Oregon Conservation Strategy, 2006).

The foundation of the Columbia Plateau Ecoregion is its geology. Beginning 17 million years ago, massive eruptions of basalt flowed out of cracks or "vents" in the earth. These vents were located in northeastern Oregon, central western Idaho and southeastern Washington and produced lava flows over a period of 11 million years. This layering of basalt flows formed the Columbia River Basalt Group (CRBG) (Orr *et al.*, 1992). Erupting from large fissures measuring 10 to 25 miles in length, the molten basalt filled basins in southeastern Washington and northeastern Oregon (Orr *et al.*, 1992). The average volume of each flow was more than 100 cubic miles of basalt with some single flows exceeding 500 cubic miles. In total, approximately 42,000 cubic miles of basalt flowed over an area almost the size of the state of Washington, ranking the CRBG as the second largest flood basalt group in the world (Bishop, 2003; Orr *et al.*, 1992). Southward, the CRBG continues to thin and tapers out in the Blue Mountains. Individual flows can be up to 200 feet thick, but vary substantially.

The flood basalt flows of the CRBG had dramatic effects on the Columbia River. Prior to eruption of the basalt flows, the ancestral Columbia River was situated far south of its present location. Gorge-filling basalt flows periodically plugged and disrupted the flow of the Columbia River, eventually forcing it northward to its modern day location.

Subecoregions of the Columbia Plateau

Within the planning area the Columbia Plateau contains 4 subecoregions: the Pleistocene Lake Basin, Umatilla Plateau, Deschutes/John Day Canyons, and Umatilla Dissected Uplands.

The **Pleistocene Lake Basin** is a nearly level to undulating lake plain with very little surface water runoff. Surface geology consists of ancient lake and flood deposits associated with ice plugged lakes in northern Washington and western Montana from about 10,000 years ago. These glacial lakes backed up hundreds of cubic miles of water before their impounding ice dams failed and released catastrophic debris floods (as many as 40 episodes) that permanently scarred the landscape on its way to the ocean. Lake Condon in the northeastern portion of the plan area is one of these ancient glacial lakes. Major vegetation is sagebrush steppe includes needle and thread grass, Indian ricegrass, bluebunch wheatgrass, Sandberg bluegrass, and basin big sagebrush. Alien cheatgrass covers

broad areas. The sagebrush steppe is used primarily for irrigated cropland, some rangeland, and irrigated poplar tree farms for pulp. Crops include winter wheat, potatoes, alfalfa, and silage corn.

Elevations range from 300 to 1,200 feet, and local relief ranges between 10 and 200 feet. The climate is very dry. The Pleistocene Lake Basins generally receive the most precipitation from November through February. These winter storms bring rain to lower elevations and snow to higher ridges and peaks. Mean annual precipitation ranges from 7 to 10 inches. Mean annual frost free days range from 140 to 200.

The **Umatilla Plateau** is a nearly level to rolling plateau mantled in loess (fine-grained, wind-deposited soil.) Glacial features such as patterned-ground are common. Most streams are ephemeral. Surface geology was created by the Wapanum and Grande Rhonde flows of the Columbia River Basalts. The basalt is occasionally cut by gullies caused by erosion, or sand, gravel, or large boulders deposited by glacial activity. The Umatilla Plateau is primarily vegetated by bluebunch wheatgrass with scattered sagebrush steppe, Sandberg bluegrass, and Idaho fescue. Stiff sagebrush occupies very shallow soils sites. Introduced cheatgrass covers broad areas of this Subecoregion. Agriculture consists of mostly cropland and some grassland. Non-irrigated winter wheat is grown using the crop-fallow rotation method. Irrigated land grows winter wheat, alfalfa, and barley.

Elevations above sea level range from 1,000 to 3,200 feet. Occasionally, valleys cut down several hundred feet from the plateau. The nearly level to rolling relief varies between 200 and 600 feet from hilltop to bottom. Mean annual precipitation ranges from 9 to 15 inches. Most streams are ephemeral. The mean annual frost free days vary from 100 to 170.

The **Deschutes/John Day Canyons** are very steep to precipitous canyon lands containing the Deschutes and John Day rivers. Surface geology is the same as the Umatilla Plateau but the rivers have exposed the depth of these layers. The land is sparsely covered by grasses and shrubs. Land is used for livestock grazing and wildlife habitat. Soils contain a significant amount of fragmented rock. This sagebrush steppe includes bluebunch wheatgrass, Idaho fescue, Sandberg bluegrass, Wyoming big sagebrush, and cheatgrass. White alder, Lewis' mockorange, western clematis, and choke cherry run along narrow canyon riparian areas.

Elevations range from 200 to 3,600 feet, with deep valleys cutting down 1,000 to 2,000 feet. Mean annual precipitation ranges from 9 to 14 inches. The mean annual frost free days vary from 100 to 190.

The **Umatilla Dissected Uplands** are dissected, hilly uplands with a terrace-like appearance. Slopes are rolling to very steep. Surface geology consists of Grand Rhonde Basalts with canyons cutting down through the older John Day and Clarno Formations. These uplands are mostly used as rangeland and wildlife habitat. Vegetation is primarily wheatgrass–bluegrass/ Idaho fescue, bluebunch wheatgrass, and Sandberg bluegrass. Forested, higher elevation, north-facing slopes contain Douglas-fir, ponderosa pine, common snowberry, pinegrass, and ninebark.

Elevations range from 1,600 to 4,400 feet. Hills rise and fall 500 to 1,500 feet. Mean annual precipitation ranges from 9 to 14 inches. Mean annual from free days vary from 100 to 160.

Blue Mountains Ecoregion

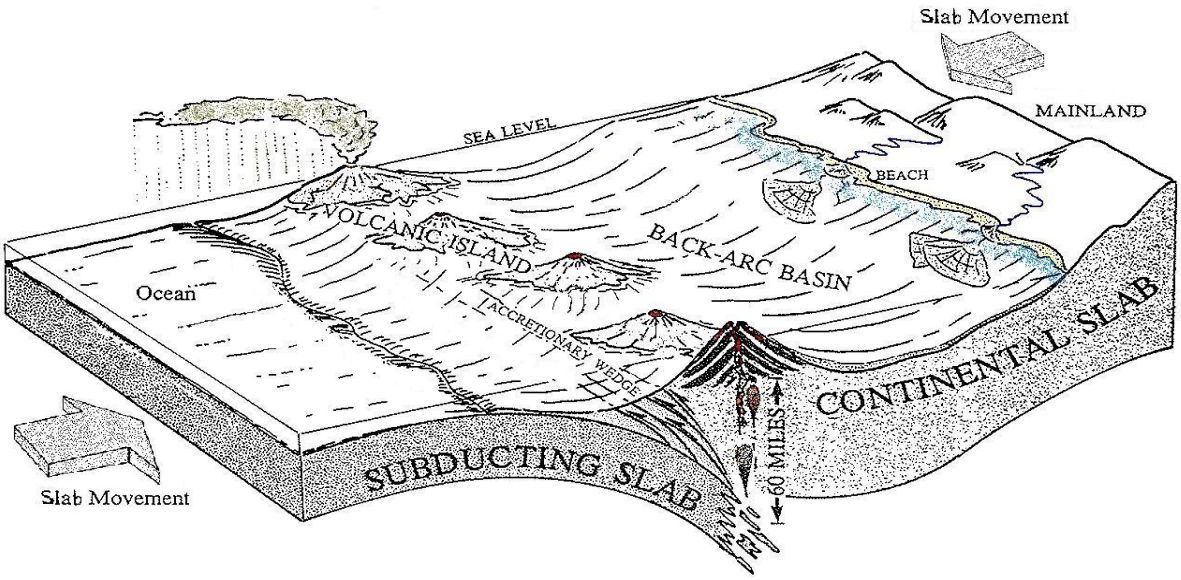
At 27,380 square miles, the Blue Mountains Ecoregion is the largest in Oregon, accounting for about 80 percent of the planning area (6,630 square miles). Named for its largest mountain range, the Blue Mountains, this Ecoregion is a diverse complex of mountain ranges, valleys, and plateaus containing deep rocky-walled canyons, glacially cut gorges, sagebrush steppe, juniper woodlands, mountain lakes, forests, and meadows. Broad river valleys support ranches surrounded by irrigated hay meadows and wheat fields. Elevation influences a varied climate that ranges in temperature and precipitation. Overall, the Ecoregion has short, dry summers and long, cold winters. Much of the precipitation (8-24" on average annually) falls as snow and the snow melt gives life to the rivers and irrigated fields (Oregon Conservation Strategy, 2006).

Wood products and cattle production dominate the economy of the ecoregion, but dryland wheat and alfalfa are important in the river valleys (Oregon Conservation Strategy, 2006). The Ecoregion supports some of the finest big game hunting in Oregon and attracts tourists year-round to the scenic lakes and rivers, geologic features, and alpine areas that characterize the area. The cities of Mitchell, Dayville, Monument, and John Day may benefit from this tourism.

While the Blue Mountain Ecoregion contains some of the largest intact native grasslands in Oregon and several conservation areas, fire suppression, selective timber harvest, and unsustainable grazing management have impacted habitat for wildlife. These changes have resulted in changes in vegetation which has increased vulnerability of forests to insects, disease, and effects of severe wildfire. The result, in-part, has become a new compliment of invasive species that gain a foothold after sagebrush steppe fires move through the area.

The foundation of the Blue Mountains Ecoregion is its geology. Approximately 200 million years ago, seas covered the entire state of Oregon. The Pacific Coast shoreline was in Idaho and eastern Washington (Orr *et al.*, 1992). The Blue Mountains were a series of volcanic island chains (similar to present day Hawaii) off the Mainland Coast. These islands were perched on top of a slab or plate of oceanic crust in the Pacific Ocean (See Figure 3-1).

Figure 3-1. Underlying Geology



Drawing modified from William and Elizabeth Orr (1996) - published with permission of the authors.

As the slabs moved toward each other, the Oceanic slab sunk beneath the North American Continental slab. The Oceanic slab scrapped off the Volcanic Islands onto the Mainland before diving down or "subducting" under the mainland. Across 400 million years, many chains of volcanic islands sprouted and were scrapped or "accreted" onto the North American Continent. Oceanic sediment and ash from the volcanoes were sandwiched onto the mainland in between the volcanic islands. These series of collisions created new landmasses called "terranes." This succession of terranes displaced the coast to its current location.

Three terranes are recognized in the John Day planning area: Baker, Grindstone, and Izee. Each terrane contains unique groups of rocks and fossils. The Grindstone terrane contains some of the oldest rocks in Oregon. Limestone and other layered rocks date from about 380 million years old. The Baker terrane is composed of heated and folded rocks from the oceanic crust. Table 3-2 displays the major rock types and ages of all three terranes.

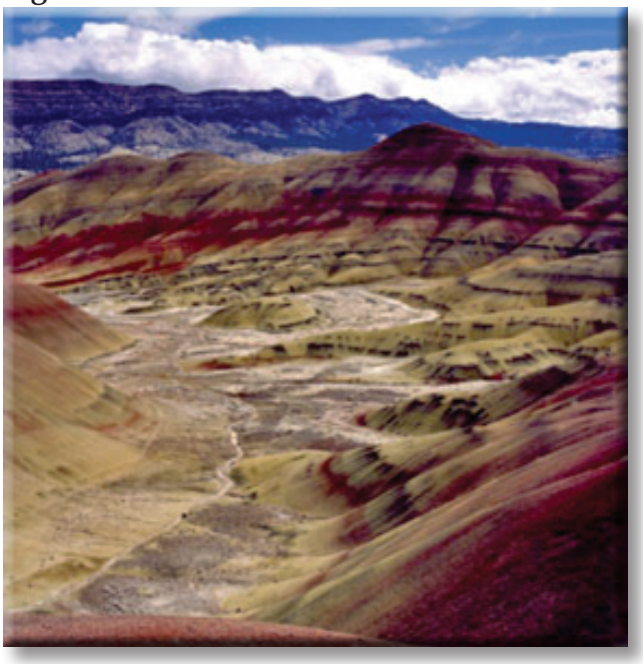
Between 120 and 160 million years ago, these terranes were intruded by magmas that later cooled to form masses of granodiorite and gabbro (Orr *et al.*, 1992). Along with the magma came hot fluids that mineralized the surrounding rocks with gold-bearing veins (Brooks and Ramp, 1968; Bishop, 2003).

Table 3-2. Accreted Terranes in the Planning Area with Rock Types and Age

Terrane	Major Rock Types	Age
Grindstone	limestone, mudstone, siltstone, sandstone, chert, argillite	about 380 – 235 million years ago
Izee	volcanic and volcaniclastic sedimentary rocks	about 220 – 175 million years ago
Baker	peridotite, gabbro, basalt, shale, argillite, chromite, and diorite	about 285 – 175 million years ago

The oldest rocks that formed on the local surface of the Blue Mountain Ecoregion are of the Clarno Formation (See Figure 3-2). Placement of these rocks began approximately 50 million years ago during the birth of the Clarno volcanoes in eastern Oregon (Bishop, 2003). The Cascade Mountains were not present at that time and the Pacific Ocean shoreline was east of the modern day location of the Cascades (Orr *et al.*, 1992). Moist air from the Pacific Ocean created a wet tropical climate and supported lush woodlands and open grasslands. The Clarno volcanoes erupted large quantities of ash, rhyolite, and andesite. Thick, loose ash was deposited on steep volcano slopes. The ash frequently mixed with water to form large mudflows. These flows moved like molasses over the landscape, entombing both plants and animals, and preserving them as fossils. Plant fossils found in these deposits include petrified wood, leaves, nuts, fruits, and seeds of tropical hardwoods (Retallack *et al.*, 1996). Fossilized remains of prehistoric horses and other mammals are also found in the Clarno Formation.

Figure 3-2. Clarno Formation



About 33 million years ago, the climate shifted from tropical to temperate, Clarno volcanism ceased and a short period of erosion ensued (Bishop, 2003). Then, a new episode of volcanic activity commenced, producing the rocks and ash beds of the John Day formation (See Figure 3-3). The volcanoes of the John Day produced explosive ash eruptions and flows that blanketed much of the region. Dense clouds of hot ash swept across the landscape and fused into "tuffs." Basalt, andesite, and rhyolite lavas also flowed from these volcanoes. Rapidly deposited ash and mud from volcanic activity provided ideal conditions for fossilization of the plants and animals living in the region at the time. Preserved leaves from dawn redwood (metasequoia) and alder are common in these deposits (Retallack *et al.*, 1996). Animal fossils include various prehistoric cats, dogs, horses, camels, rodents, and rhinoceroses.

Figure 3-3. John Day Formation

Approximately 16 million years ago, massive flows of basalt erupted from large cracks near Monument and Kimberly. The lava flowed out at speeds up to 30 miles per hour. Layer upon layer of columnar basalt form the Picture Gorge Basalts (Orr *et al.*, 1992). Between the basalt layers are thin bands of silt and limestone, telling us

that there was often a lull between successive volcanic flows. The Picture Gorge Basalts cap the John Day and Clarno Formations (See Figure 3-4).

Figure 3-4. Picture Gorge Basalts on top of Clarno Formation

US Park Service Photo from 1925.

Subecoregions of the Blue Mountains

The Blue Mountains includes nine Subecoregions in the planning area, including: **John Day/Clarno Uplands, John Day/Clarno Highlands, Maritime-Influenced Zone, Melange, Continental Zone Highlands, Continental Zone Foothills, Mesic Forest Zone, Subalpine Zone, and Cold Basins.**

The **John Day/Clarno Uplands** are moderately to highly dissected hills and low mountains. Hills are rolling to steep and mountain slopes are steeply sloping. Scattered buttes occur, throughout the hills and mountains. Major valleys are formed by the John Day River. Surface geology consists of volcanic ash, alluvium, and piedmont gravels from the Clarno and John Day formations. Basalt, tuff, andesite, rhyolite, and breccia from Picture Gorge Basalt and other isolated volcanic activity are also part of the surface geology. Dominant vegetation associations include wheatgrass–bluegrass and juniper steppe woodland. The vegetation includes bluebunch wheatgrass, Idaho fescue, basin wildrye, Wyoming big sagebrush, and Thurber's needlegrass. Western juniper woodland transitions into higher elevation ponderosa pine forest. Riparian areas include white alder, Lewis' mockorange, chokecherry, clematis, willows, black cottonwood, and water birch.

Elevations range from 1,600 to 4,400 feet and relief from hilltops to bottoms vary from 400 to 2,500 feet. Mean annual precipitation ranges from 10 to 16 inches. Mean annual frost free days vary from 70 to 150.

The climate of the John Day/Clarno Uplands has a noteworthy history of intense thunderstorms. Occasional thunderstorms produce intense precipitation that localized flooding ("flash floods") occurs.

Dr. John Merriam, a University of California paleontologist, experienced just such a flood during a fossil hunt in 1900. On June 23, Merriam and a companion were digging near Bridge Creek, 6 miles downstream from Mitchell in central Oregon. They were working in the shade of a low cliff under a partly cloudy sky. Suddenly,

> *...there began to fall what might best be called balls of water. Thinking the shower would soon pass, we kept at work, but heavy clouds swung across the sky. During the next hour, as we made our way out of the area, we were exposed to one of the hardest rain storms I have ever seen.*

That storm devastated a large area in Wheeler County. Crops were destroyed, mud- and rockslides were common, and farm buildings were destroyed. Eyewitnesses reported hailstones up to 6 inches in diameter. Fortunately, no lives were lost. Not far away from the site of that storm, in a secluded graveyard, are buried Nancy Wilson and three of her children. They died on June 2, 1884, when an intense thunderstorm sent a "wild torrent of muddy boulder-laden water over the flatlands of what is now Painted Hills State Park."

The same area was also the scene of one of the largest flash floods in the United States. On July 13, 1956, intense thunderstorms and heavy rain occurred near Mitchell between 5 and 6 in the evening. During the event Bridge Creek rose from its depth of 1 foot to a torrent, that destroyed upwards of 20 buildings including houses, businesses, a garage, and a post office. A highway was blocked by washouts and mud and rock slides. People who had accidentally left open containers out during the 50-minute storm calculated that the rainfall was 3.5 inches in Mitchell and 4 inches in Girds Creek. This was more than 25% of the area's annual average rainfall!

Intense thunderstorms similar to those in the Mitchell area have been observed near Spray and most recently along the South Fork John Day River. These intense thunderstorms frequently wash across the John Day/Clarno Uplands, taking out roads and creating new river features.

The **John Day/Clarno Highlands** consist of moderately to highly dissected, steeply sloping low mountains and rolling hills. The area includes broad streams fed more by springs than by snow melt. Surface geology is similar to that of the John Day/Clarno Uplands, but also includes colluvium from the eroding Picture Gorge Basalts. Dominant vegetation associations include western ponderosa pine forest/ open ponderosa pine, Douglas-fir, and western juniper. Vegetation includes mountain-mahogany, common snowberry, mountain big sagebrush, antelope bitterbrush, elk sedge, Idaho fescue, and bluebunch wheatgrass. Riparian areas include grand fir, gray alder, redosier dogwood, ninebark, Wood's rose, Rocky Mountain maple, and various willows. These forest and woodland areas are used for woodland grazing, logging, and recreation.

Elevations range from 3,000 to 6,200 feet. The mountains and hills rise from 200 to 2,000 feet. Mean annual precipitation ranges from 16 to 28 inches. Mean annual frost free days vary from 30 to 100.

The **Maritime-Influenced Zone** consists of gently-sloping to hilly volcanic plateaus and mountain valleys. Springs occur throughout this zone. Most of the surface geology consists of the Grande Rhonde Basalt flow which was part of the Columbia River Basalt Flows. Major vegetation associations include Western ponderosa pine forest, and grand fir–Douglas-fir forest. Most of the forest is composed of ponderosa pine with scattered Douglas-fir and grand fir. Dense forest understory and riparian shrub cover consists of common snowberry, rose spirea, ninebark, serviceberry, and redosier dogwood. Herbaceous ground cover includes heartleaf arnica, pinegrass, elk sedge, Idaho fescue, Sandberg bluegrass, and bluebunch wheatgrass. This forested landscape is primarily used for logging, grazing, wildlife habitat, and recreation.

Elevations range from 3,000 to 6,000 feet. The plateaus drop down 150 to 1,600 feet to valley bottoms. The climate is moderated by moderate maritime weather and oceanic trends. Mean annual precipitation ranges from 20 to 40 inches. Most of this annual precipitation arrives in the late winter and early spring. Compared to other areas in Oregon, the monthly precipitation values are fairly evenly distributed. Mean annual frost free days range from 40 to 80.

The **Melange** consists of mid-elevation mountains with few perennial streams. The surface geology was created by the sandwiched ocean sediments during accretion events and intrusions of magma through those layers. Stiff flows of the Strawberry volcanics cover portions of this Subecoregion. These events combine to create a surface geology consisting of a mix of colluvium, basalt, andesite, rhyolite, granite, partly metamorphosed limestone, marble, chert, argillite, shale, greywacke, serpentine, greenstone, and schist. Major vegetation associations are western ponderosa pine forest, and juniper steppe woodland. Vegetation includes ponderosa pine, Douglas-fir, subalpine fir, lodgepole pine, western larch, grand fir, grouse whortleberry, common snowberry, little prince's pine, sidebells, twinflower, pinegrass, elk sedge, and heartleaf arnica. Riparian areas are vegetated with gray alder, redosier dogwood, prickly currant, black currant, Columbia monkshood, and bluebells. This forested landscape is used for woodland grazing, wildlife habitat, and mining. Only limited logging occurs due to the difficulty in reforesting the droughty, exposed soils. Historic placer mining for gold has altered the structure of many streams.

Elevations range from 3,500 to 7,400 feet. The local relief varies from 600 to 3,400 feet. Mean annual precipitation ranges from 16 to 35 inches. Mean annual frost free days range from 30 to 90.

The **Continental Zone Highland** consists of moderately dissected, mountainous volcanic plateaus. Mountain slopes are steep and scattered with cinder cones. Surface geology consists of colluvium and volcanic ash from the Strawberry Volcanics. Major vegetation associations are western ponderosa pine forest, grand fir–Douglas-fir forest, and sagebrush steppe/ponderosa pine. Vegetation includes Douglas-fir, grand fir, juniper, antelope bitterbrush, common snowberry, mountain-mahogany, mountain big sagebrush, stiff sagebrush, elk sedge, pinegrass, bluebunch wheatgrass, and Idaho fescue. This forested area has a xeric shrub or bunchgrass understory. These highlands are used for livestock grazing, logging, and recreation.

Elevations range from 4,000 to 6,700 feet. Local relief varies from 400 to 2,000 feet. Mean annual precipitation ranges from 16 to 30 inches. Mean annual frost free days vary from 50 to 80.

The **Continental Zone Foothills** consist of hills and scattered buttes. A few perennial streams occur and originate in the surrounding mountain ranges. Much of the surface geology is basalt and ashflows from the Strawberry volcanics. Some of the Jurassic and Triassic graywacke, siltstone, and limestone are present across the foothills. Triassic layers consist of gabbro and metamorphic rock. Vegetation associations include sagebrush steppe/ Bluebunch wheatgrass, mountain big sagebrush, Idaho fescue, Wyoming big sagebrush, Sandberg bluegrass, and, on schist, spiny greasebush. The shrub- and grass-covered land is utilized for livestock grazing and wildlife habitat.

Elevations range from 1,800 to 6,000 feet. Local relief varies from 200 to 2,500 feet. Mean annual precipitation ranges from 9 to 18 inches. Mean annual frost free days vary from 50 to 140.

The **Mesic Forest Zone** is a dissected, volcanic plateau with some mid-elevation mountains. Intermittent headwater streams or perennial streams are fed by snow melt from adjacent mountains. Surface geology and bedrock includes basalt flows, volcanic ash and colluvium associated with Picture Gorge Basalts. The Mesic Forest Zone geology also includes some older areas of granite, sedimentary rock, volcanic and partly metamorphosed sedimentary and volcanic rocks. Major vegetation associations include grand fir–Douglas-fir forest. Cold slopes contain subalpine fir, Engelmann spruce, mountain hemlock, lodgepole pine, big huckleberry, grouse whortleberry, Utah honeysuckle, sidebells, round leaved violet, and northwestern sedge. Cool moist slopes exhibit grand fir, western larch, bride's bonnet, and little prince's pine. The vegetation on drier slopes includes Douglas-fir, ponderosa pine, mountain maple, ninebark, pinegrass, elk sedge, and largeleaf sandwort. This forested landscape is used for logging, woodland livestock grazing, wildlife habitat, and recreation.

Elevations range from 4,000 to 7,000 feet. Local relief varies from 400 to 2,500 feet. These areas are influenced by marine air coming through the Columbia River Gorge to the west. Mean annual precipitation ranges from 30 to 60 inches. This comes mostly in the form of snow and persists into late spring. Mean annual frost free days vary from 15 to 70.

The **Subalpine-Alpine Zone** includes high elevation, glaciated mountains with arêtes, cirques, mountain slopes, tarns, permanent snowfields, and a remnant glacier. The high gradient streams have boulder and cobble substrates. Surface geology includes volcanic ash and colluvial deposits from the Strawberry Volcanics and Picture Gorge Basalts. Intrusive formations of basalt and andesite are the result of magma pushing up through layers of older rocks that changed the rocks as they cooled. The area is dotted with rock. Surface geology includes remnant glacial deposits associated with glaciers from glacial Lake Missoula, e.g., about 2 million years ago. The dominant vegetation associations are western spruce–fir forest and alpine meadows–barren. Common species include subalpine fir, whitebark pine, Engelmann spruce, and lodgepole pine. Dry south-facing slopes have mountain big sagebrush and Idaho fescue. Wet meadows contain heather and Parry's rush. The tree line is vegetated by krummholz. Alpine meadows are marked by greenleaf fescue and Hood's sedge. The highest elevations consist of rock outcrops, rubble land, and snowfields. This expanse of forest, meadowland, and bare rock is used for recreation, and wildlife habitat. The land is used for summer livestock grazing. The Subalpine-Alpine Zone is an important water source for lower elevation areas.

Elevations range from 6,500 to 9,900 feet. Local relief varies from 600 to 3,000 feet. Mean annual precipitation ranges from 35 to 80 inches and is mostly snow. Mean annual frost free days vary from 10 to 30.

The **Cold Basins** are cold, wet valleys and basins. Most streams have been channelized, but undisturbed reaches are meandering, with well developed floodplains. Surface geology consists of recent alluvium and lacustrine deposits. Older layers are formed from ash and sediment. The dominant vegetation associations are sagebrush steppe and wetlands. Common vegetation includes sedges, mountain big sagebrush, little sagebrush, and Idaho fescue. Wetlands and wet meadows are covered with tufted hairgrass, Baltic rush, and non-native Kentucky bluegrass. The pastureland, shrubland, grassland, and wetlands are heavily grazed by cattle and elk. Meadow hay is harvested for winter livestock feed.

Elevations range from 3,600 to 6,000 feet. Local relief is mostly level. Mean annual precipitation ranges from 12 to 25 inches and is mostly snow. Mean annual frost free days vary from 20 to 50.

Soils

Factors in Soil Formation

Soils are defined by the processes that form them including climate, topography, parent material, and organisms living in the soil. Through time, these processes form unique soil types and influence what plants grow.

Climatic influences are reflected by soil temperature and moisture. In the planning area, we have two soil moisture regimes: dry and moist. Common soil temperature regimes in the planning area include warm and cool.

Soils play an integral part in vegetation community development. Plant communities are most noticeably influenced with extremes in soil texture and thickness of soil horizons, depth to restrictive layers including abrupt soil horizon boundaries, and by soil drainage or depth to water table.

Deep to very deep soils occur in alluvial drainages, floodplains and river terraces of the John Day River, and on North and Northeast facing slopes influenced by leeward soil deposition from the prevailing winds, and on colluvial (rockfall) foot slopes from water and gravity deposition. Shallow and very shallow soils occur on flat basalt table lands, and on upland ridge top and shoulder slopes.

The soils in the Columbia Plateau are derived from weathered basalt and some wind deposited silt. Silty soil textures occur in the Umatilla Plateau and Pleistocene Lake Basins. At higher elevations, the deep loess soils become thinner. The John Day Canyons have higher rock fragment content than the surrounding areas. High rock fragment content helps protect the soil from erosion.

The soils in the Blue Mountains are derived from a myriad of surface geology, including: ash, basalt flows, and partially heated and metamorphosed oceanic rocks. The Canyons and Highlands have shifting colluvial soils on steep canyon slopes shallow, cobbly soils occur in the continental zone highlands. The soil of the mesic forest zone has a significant ash layer that is relatively rock free and also helps to retain moisture during the dry season.

A functioning soil biological community includes insects, biologic crusts, and in forests large wood in various stages of decay. Small organisms reduce dead plants into tiny pieces so fungus and bacteria can rot them, helping spread bacteria and protozoa through the soil.

Sensitive Soils and Disturbances

Sensitive soils are those soils that are more vulnerable to soil productivity loss with disturbance. Sensitive soils in the planning area have been modeled based on soil properties that make them susceptible to site degradation. These properties include steep slopes, soil texture, water erosion, droughty sites, and depth to bedrock. Map 3 in Chapter 2 shows planning area soil vulnerability to site degradation. Table 3-3 correlates the common soil associations with Subecoregions and the percent of those Subecoregions with sensitive soils.

Common soil disturbances in the planning area include timber harvest, wildfire, prescribed fire, off road vehicle use, poorly drained roads, livestock and wildlife grazing, and mechanical treatment of vegetation. These and other surface disturbing activities can decrease soil cover and contribute to increased erosion, decreased infiltration, and reduced soil productivity.

Within the planning area, regions of intense off highway vehicle use are exhibiting static to downward trends in soil productivity. Soil productivity trends are static to improving in rangelands with good perennial grass cover, shrub/tree canopy cover less than 10 percent, and grazing systems that allow for vegetation (grass) recovery and rest. With increases in the density of forest and juniper stands the potential for wildfire to damage soil productivity also increases.

Table 3-3. Sensitive Soils by Soil Associations and Subecoregion

Ecoregion	Subecoregion	Common Soil Associations (% of Subecoregion)	Percent of Subecoregion with Sensitive Soils
Columbia Plateau	Umatilla Plateau	Ritzville-Walla Walla-Condon-Bakeoven (63%)	13%
	Pleistocene Lake Basins	Ritzville-Olex-Walla Walla-Roloff (51%)	13%
	John Day Canyons	Lickskillet-Wrentham-Rock Outcrop-Bakeoven (81%)	61%
	Umatilla Dissected Uplands	Gwin-Waha-Simas-Gurdane (55%)	17%
Blue Mountains	John Day/Clarno Uplands	Simas-Tub-Waterbury-Gwin (51%)	27%
	John Day/ Clarno Highlands	Klicker-Hankins-Tolo-Bocker (63%)	30%
	Maritime-Influenced Zone	Klicker-Tolo-Hall Ranch-Anatone (77%)	14%
	Melange	Tolo-Klicker-Helter-Anatone (50%)	54%
	Continental Zone Highlands	Klicker Tolo-Hankins-Anatone (65%)	25%
	Continental Zone Foothills	Ateron-Menbo-Observation-Westbutte (54%)	24%
	Mesic Forest Zone	Helter-Klicker Tolo-Ateron (54%)	44%
	Subalpine-Alpine Zone	Helter-Rock Outcrop-Klicker-Ateron (55%)	54%

Unique Soil Resources

Hydric (wet) soils, prime agriculture land, and unique biological soil crusts are key soil resources in the planning area.

Hydric Soils

Hydric soils constitute only a small portion of the planning area. Hydric soils are associated with riparian areas in poorly drained back waters along flood plains and in small spring seeps through out the planning area. Soil mapping frequently excludes hydric soils because of the limited distribution and areal extent.

Biologic Soil Crusts

Biologic soil crusts (BSC) are made up of tiny living plants and bacteria that grow together on the soil surface. They help keep the soil from washing or blowing away, fix nitrogen from the atmosphere into the soil, help keep

out weeds, and promote the health of plant communities. In areas where BSCs have been lost native vascular plants have been replaced by invasive species such as cheatgrass or medusa head.

The John Day Basin biological soil crust communities are unique. They are often more stable and more diverse than BSC communities in other parts of the west. A combination of relatively stable soils, moderate annual precipitation and many sunny days allow these BSC communities to develop quickly and withstand disturbances. However, sandy or clayey soil conditions promote crusts that are less tolerant of disturbance than the crusts in loamy volcanic soils that dominate the basin.

A globally threatened species in biological soils crusts, St. Jacob texosporium lichen, is widespread in the basin. This species has become rare or has been extirpated from most of its Oregon, Washington, Idaho and California range. This species is found in windy locations, such as ridgelines and hill tops. It occurs in both the loamy and sandy portions of the basin.

Prime Farmland

For more than two decades, the State of Oregon has maintained a strong policy to protect farmland through, "preservation of a maximum amount of the limited supply of agricultural land" (ORS 215.243). The acres of BLM land zoned as agricultural are shown in Table 3-4. Counties inventory agricultural land, designate it in their comprehensive plan, and adopt policies to preserve it. Lands zoned as Exclusive Farm Use (EFU), have restrictions designed to limit development that would conflict with agriculture. It keeps farmland from being divided into parcels too small for commercial agriculture.

Only 2,000 acres of the agricultural lands listed in Table 3-4 are considered prime farmland. Many of these lands are small parcels of fields managed by adjacent private land owners. Larger fields are leased for agricultural production, cooperatively managed to grow wildlife food and cover crops, or grow perennial vegetation which does not require irrigation once established.

Table 3-4. Acres of BLM Land Zoned as Agricultural

County	Zone	Acres
Gilliam		56,029
	Gilliam County AE Zone	56,029
Grant		124,648
	Multiple Use Range MUR40	120,758
	Primary Farm EFU20	3,769
	Primary Farm EFU40	121
	Primary Farm EFU80	0
Jefferson		22,940
	Rangeland Zone RL	22,940
Morrow		438
	EFU Zone	438
Sherman		37,960
	EFU F1 Zone	37,960
Wasco		26,006
	Wasco County A1-80 Zone	26,006
Wheeler		137,437
	EFU Zone	137,437

Prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. It must also be available for these uses. It has the soil quality, growing season,

and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.

Air Quality

Residents of the John Day Basin enjoy the benefits of generally good air quality, especially when compared to large urban areas (see EPA's AIRData website http://www.epa.gov/air/data/index.html) for data. There are only a few large industrial emission sources in the planning area. Coupled with a low population, this typically means cleaner air. Air quality has been monitored in Umatilla County since 1997 and in Wasco County from 2001 through 2005. No exceedences of NAAQS have occurred in either county. As of 1999 (latest data available), there were 10 point sources of particulate matter within or adjacent to the planning area, of which the biggest emitter was the co-generation plant in Prairie City. Few or no days in any of the counties of the John Day Basin had an Air Quality Index that exceeded 100 (unhealthy air) in any of the past several years. During the summer and fall smoke from wildfire and prescribed fires, occurring both within the planning area and drifting from outside sources, can create landscape haze. Most communities in the Blue Mountain Eco Region Unit are susceptible to inversions. The updated Oregon Smoke Management Plan does regulate prescribed burning on all forested lands across the state; however Oregon State law exempts rangeland and agricultural burning from regulation east of the cascades (which includes all of the planning area). The Strawberry Mountain Wilderness is the only Class one area that is within the planning area. There are no non-attainment areas within 100 kilometers of the planning boundary. There is one air quality maintenance area located in La Grande which is 25 miles northeast of the planning area boundary.

Fuel types on BLM lands are generally lighter than those on Forest Service lands with shorter burn times. Smoke from prescribed fire is usually dissipated out of the area within a few days. Prevailing winds are from the Northwest in the summer months and would transport smoke to the southeast into mostly unpopulated areas.

Vegetation

Vegetation within the planning area is a product of the physical and climate properties associated with the Subecoregions and modifications introduced by natural processes, including, fire, insect infestations, disease, and floods as well as human uses such as grazing management, introduction of exotic species, farming, mining, fire suppression, and timber harvest. Map 4 in Chapter 2 displays the biophysical settings of the John Day Planning Area.

The primary disturbance element has been wildfire. Occasional episodes of insect/disease epidemics and wind and moisture driven erosion have also formed the vegetation patterns across the John Day Basin. Climatic variations and associated disturbance elements created a landscape of vegetative conditions that varied within a range referred to as a Historic Range of Variability (HRV). Sagebrush and juniper dot the slopes, grass lines the valleys, and pine forests ring mountain peaks. Lush green vegetation trims the many streams, rivers and springs in the planning area. Along the plateaus swaths of wheat fields alternate with remnant grasslands. Spring wildflowers of lupine, balsamroot, and paintbrush create brilliant displays of purple, yellow, and red.

Riparian Vegetation

Riparian Vegetation occurs along the margins of streams, ditches, springs, seeps, and seasonally ponded soils in the planning area. The structure and type of vegetation is critical to wildlife and fish, even when it does not control stream condition and function as discussed in the "Stream Channels and Floodplains" section. Hardwoods such as aspen, some taller willows, and cottonwood supply vertical structure for neo-tropical birds. As the trees age and decay, cavity nesters make use of them. Vegetation also supplies shade to the stream and

helps to cool the water. Leaves from hardwoods supply nutrients to the riparian and aquatic system. In some areas, these leaves can be the driving force as a food source for aquatic macro invertebrates and therefore for the native fish.

Riparian areas and associated vegetation continuously evolve. Lakes and ponds gradually fill with sediments, and rivers and stream channels move about within the valley floor. Vegetation types gradually develop to fit the newly created environments associated with movement of the stream, its soil and water features. Stable plant communities are short lived, except in armored bedrock or low gradient meadows. Vegetation units within riparian areas are constantly moving or swapping their community types.

Riparian areas in the planning area occur as deciduous stands of trees and shrubs including a mosaic of herbaceous species that occur along the riparian margin. These woodlands and shrublands require periodic flooding and bare, moist substrates for reestablishment. Low-elevation canyons and draws contain shade intolerant shrubs on higher gradient cobble streams. On reaches with developed floodplains and finer soils sedges and rushes line the stream banks. In higher elevation steep-sided canyons or in narrow V-shaped valleys a mix of birch, alder, willow, and dogwood form thickets. Sites are subject to temporary flooding during spring runoff. In interrupted reaches, underlying gravels may keep the water table just below the ground surface, and are favored substrates for establishment of cottonwoods.

Some of the most common riparian/wetland plant associations include sandbar or coyote willow, broadleaf cattail, American speedwell, creeping spike, chairmaker's bulrush, reed canarygrass, naked sedge, basin wildrye, netleaf hackberry-Lewis' mockorange, alder/dogwood, peachleaf willow, and Baltic rush. Brief descriptions of these associations, with photos, are displayed below.

Figure 3-5. Coyote Willow on Bridge Creek

Salix exigua (Sandbar or coyote willow) association is a tall shrub community found across much of the western United States and is common in the planning area. In the Blue Mountains, this association occurs on gravelly or cobbly alluvial bars and banks along streams with a sequence of pools and riffles. Sites frequently contain deep fine textured soils overlaying cobble gravels. Between the willows grows a patchy herbaceous layer with reed canarygrass, quackgrass, bentgrasses, and stinging nettle or thistles. This type frequently appears between a streamside grass or rush community and various more stable or drier shrub riparian type.

Figure 3-6. *Typha latifolia* (Broadleaf cattail)

Broadleaf cattail is a wide spread association. It occurs on cobbly and/or gravelly alluvial bars or developing floodplains. It is typically found adjacent to pool/riffle sequence streams and recovering incised stream channels. This association is found at permanently or semi-permanently flooded sites at the edges of lakes and ponds and in ditches, oxbows and backwater areas.

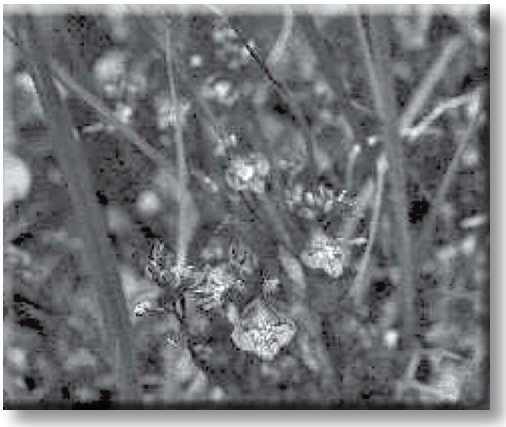


Figure 3-7. The American speedwell
Gary A. Monroe @ USDA-NRCS PLANTS Database

The American speedwell association is found mostly in streams on channel shelves (alluvial bars parallel to the banks of a stream) in extremely shallow, gentle gradient sections of faster-moving streams.

Figure 3-8. Layering of creeping spike rush, 3-square full rush up to cockleburr on the mainstem John Day River

Along the mainstem John Day River and other major tributaries, a community of common spikerush and chairmaker's bulrush line the banks and shift in relative dominance. This association occurs along the low water line with coyote willow, and reed canarygrass along elevations corresponding to higher river flow levels. Cockleburr grows among the willows and in sandy deposits near bankfull.

Figure 3-9. Reed canarygrass
Gary A. Monroe @ USDA-NRCS PLANTS Database

Reed canarygrass grows in open areas and on more developed soils of floodplains. It is extremely aggressive and often forms persistent, monocultures in wetlands and riparian areas. Infestations threaten the diversity of these areas, since the plant chokes out native plants and grows too densely to provide adequate cover for small mammals and waterfowl. Once established, reed canarygrass is difficult to control because it spreads rapidly by rhizomes (Washington State Department of Ecology).

Figure 3-10. Naked sedge near Burnt Ranch on the John Day River

Naked sedge association is abundant along all the forks of the John Day River. Naked sedge plants are scattered along the lower John Day River but rarely form large groups. Sites are bouldery stream banks and narrow alluvial bars adjacent to the banks of streams with well developed point bars. Asters, field mint, tomcat clover, field horsetail, and fringed willowherb are scattered at low abundance among the boulders. The sedge plants grow on top of boulders with their root masses sitting in the stream most of the growing season.

Great Basin wildrye association is commonly found in swales and at the base of alluvial fans and toeslopes in lower precipitation zones. Soils are generally deep and fine-textured and have moderate water holding capacity. Sites are moist to wet in the spring and moist to dry by mid summer. Great Basin wildrye dominates the site. Other herbaceous species and occasionally shrubs are minimal.

Netleaf hackberry-Lewis' mockorange association is found at low elevations along stream banks and high floodplains in high gradient, narrow with moderate sideslopes. This association grows in soils with high coarse fragment contents. Netleaf hackberry forms a scattered to dense tall shrub layer. Lewis' mockorange is a co-dominant feature. Blue elder and oceanspray occasionally occur alongside the hackberry and mock orange. In the planning area, this association occurs along streams and rivers and where talus slopes meet the river.

Figure 3-11. White alder in Pine Hollow

White alder/red-osier dogwood association occurs mainly on the lower elevation streams of the Blue Mountains Ecoregion and sporadically in the Columbia Basin Ecoregion. Sites are stream banks and floodplains along cobbly pool/riffle streams. Valleys are north-facing, moderate gradient, narrow with moderately steep sideslopes. This association is probably the result of a disturbance event such as intense flooding. White alder may form an open to dense canopy over red-osier dogwood, netleaf hackberry and Lewis' mockorange. Other shrubs may occur, including common chokecherry, elderberry, cascara, Woods' rose and currants. Herbaceous species are sparse. Upland vegetation types adjacent to sites are sideslopes of sagebrush steppe, Idaho fescue and bluebunch wheatgrass.

Figure 3-12. Mountain alder/red osier dogwood association on Deer Creek

Mountain alder/red osier dogwood association is found at moderate elevations in the Blue Mountains Ecoregion. It occurs in V-, box, or trough-shaped valleys with moderate gradients. It grows on stream banks, alluvial bars, and floodplains. Soils are shallow, skeletal, mineral alluvium over water-worked gravel and cobbles that remains wet throughout the growing season. In the planning area, this association occurs at higher elevations than the White alder association. This community is a closed canopy with an 8 to 10-foot tall shrub thicket of mountain alder and red osier dogwood. Either shrub can be dominant but both always contribute significantly to total cover. Mountain alder can appear as a tree above the red osier dogwood in some areas. This association usually contains a shorter, sparse shrub layer of Woods' rose and golden current with white clematis draped among the branches.

Peachleaf willow association occurs on open, sites with little shade. The understory consists of white clematis and patches of smooth brome and common horsetail. Peachleaf willow is a rapidly growing, short-lived medium-sized deciduous tree that is typically from 20 to 40 feet tall. Peachleaf willow is an early successional species which pioneers floodplain alluvium. Peach leaf willow is found along the lower reaches of the South Fork John Day and in rangeland streams.

The Baltic rush association is widespread. It is found at moderate elevations in moderately wide, low gradient, trough- and flat-shaped valleys with gentle to moderate side slopes. Sites are dry to wet basins, floodplains, and springs. Most of the soils are fine textured and have high water holding capacity. This associate occurs in lower gradient, depositional reaches of the planning area streams. Most sites are flooded during the spring and early summer. The water table drops late in the growing season. Baltic rush cover ranges from 20-99%. Other herbaceous species found in this association include Woolly sedge, Nebraska sedge, and slenderbeak sedge. This is a common association in the lower gradient reaches of tributaries in the North Fork John Day planning area.

Riparian Key Features

Aspen and cottonwood forest woodlands historically occur across large portions of the planning area. Historic photos show large riparian forests near Dayville and at Clarno which have vanished. Major causes of decline of black cottonwood stands in eastern Oregon include: conversion of stands for pasture, farmland, or urbanization, conversion of streams from multiple to single channel systems, and restriction of lateral movement of streams across floodplains. Overbrowsing by livestock, elk, and deer, reduced fire frequency, and logging for firewood have also had impacts.

Cottonwood deserves special consideration in the discussion of riparian vegetation. Many cottonwood stands have declined in the area. Streamside black cottonwoods contribute to favorable aquatic habitat by providing stream bank stability and reduced siltation, maintaining low water temperatures through shading, increasing debris recruitment for variable stream habitats, and providing nutrient-rich litter for aquatic food webs. Black cottonwood is an important source of cover for wildlife and livestock.

Along BLM streams in the Middle and North Fork subbasin, 11 small segments were found to contain an occasional relic cottonwood tree: Matlock, Stony, Rush, West Fork Boneyard, Cabin, Ditch, Squaw, Graves, Mallory, unnamed tributary to Mallory, and an unnamed tributary to Little Wall Creek from the east. The South Fork John Day River drainage has relic areas of aspen and cottonwood communities along the mainstem. Relic areas on the tributaries are being encroached by surrounding conifers. In the Lower subbasin, relic areas are scattered and include portions on Long Hollow and Hay Creek. Native cottonwood stock is grown at Clarno. Outplantings have been successful along tributaries such as Bridge Creek and along the mainstem John Day River near Clarno.

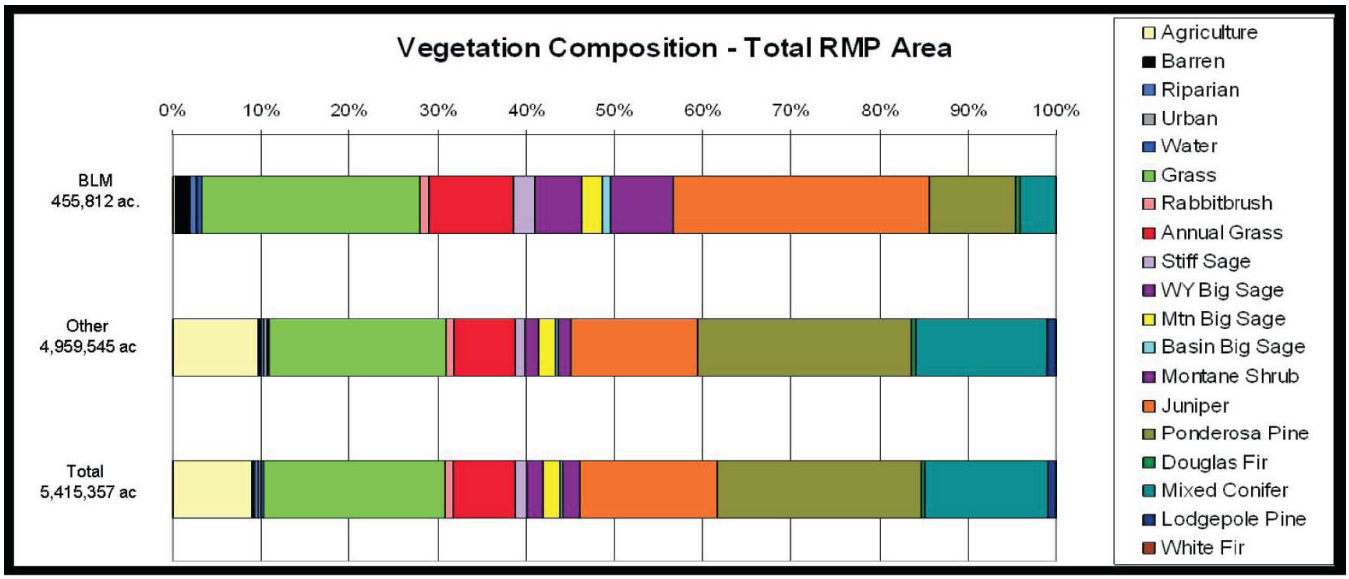
Generally, aspen occupy moderate, mid-elevation slopes as small, scattered stands in the mixed conifers of Douglas-fir and ponderosa pine (3,000 to 5,000 feet). A few aspen woodlands appear in riparian zones at lower elevations. On BLM managed public land in the Middle and North Fork Subbasin, aspen was found on only three small tributaries (west fork of Boneyard Canyon, No Name Creek and south tributary to Little Wall Creek). The aspen had stunted growth or were dying, and occurred on small alluvial valleys or on the edges of down cutting meadows. None of the stream reaches containing aspen are functioning hydrologically (see Hydrology section), and few are showing any signs of improvement.

Terrestrial Vegetation

Terrestrial Vegetation within the planning area reflects a range of conditions represented by the many Subecoregions within the planning area. The following text describes the primary non-riparian vegetation communities found within the planning area. In 2006 and 2007, the Prineville District mapped existing and potential vegetation respectively across the nearly 5.5 million acres within the planning area. Existing vegetation was mapped using 2004 and 2005 remote sensing data, plot data - including forest inventory data (Vidourek, 2005, and local knowledge). Potential vegetation was mapped using data sets from Landfire, Ecological Site Inventory (ESI), soils, vegetation plots, and local knowledge. Vegetative community descriptions are based on Landfire Biophysical (BpS) descriptions. Biophysical descriptions identify a range of seral structural conditions that can occur on a site based on environmental and disturbance factors. Appendix E provides summary descriptions of applicable BpSs. A complete BpS description is available on the Landfire web page or upon request from the Prineville District Office.

Figure 3-13: Vegetation Composition displays existing proportions of major vegetation groups within the planning area. Percent compositions are for lands managed by the BLM and lands owned/managed by private owners or other government agencies. Of note is the larger percentage of BLM land with riparian, shrub species, and juniper habitats. Other land ownerships have higher percentages of agriculture (Private) and forest species (Primarily Forest Service). Because the BLM manages less than 10 percent of the planning area the proportions of the groups managed by the BLM barely influences the proportions for the entire planning area. Vegetation conditions and trends by major plant communities will be addressed in more detail below.

Figure 3-13. Vegetation Composition



Appendix F compares existing seral structural conditions to site potential identified in the appropriate BpSs. Vegetation conditions and trends by major plant communities will be addressed in more detail below.

Grasslands (including Palouse Prairie)

The Columbia Plateau Ecoregion of northeastern Oregon and southeastern Washington is an elevated plateau containing considerable area of open palouse grassland that remains unfarmed because of thin soils and a short growing season. North central Oregon has the largest area of remaining true palouse prairie (Holechek *et al*, 1989 pg. 87)

Disturbance

The fire return interval for sagebrush and bunch grass is estimated at 25 years. The native bunchgrass habitat apparently lacked extensive herds of large grazing and browsing animals until the later 1800s. Burrowing animals and their predators likely played important roles in creating small-scale patch patterns (Johnson and O'Neil, 2001 pg. 49). Typical patch sizes were large with maximum fire sizes of 10,000 acres and an average of 1,000 acres (USDA Forest Service and USDI Bureau of Land Management, 2007a. BPS 081142).

Conditions/Influences

The Palouse Prairie, also referred to as the northwest bunchgrass prairie, has had the highest percentage conversion into farmland of all western range types. The Palouse is one of the most endangered ecosystems in the U.S. with only 1% of the original habitat remaining; it is highly fragmented with most sites <10 acres (Johnson and O'Neil, 2001 pg. 49). Today it is used primarily for wheat production (Holechek *et al.*, 1989 pg. 87). Bluebunch wheatgrass and Idaho fescue, the two primary bunch grasses in this type are decreasing under heavy grazing pressure. Additionally, historic over-grazing and the increase of nonnative annual grasses such as cheat grass and Medusa head have altered fire return intervals and effects. The majority of the Agriculture displayed in Figure 3-13 is within the Palouse Prairie.

Trend

Since 1900, 94% of the Palouse grasslands have been converted to crop, hay, or pasture lands (see Map 18: Key Vegetation Elements) (Johnson and O'Neil, 2001 pg. 491). Over-grazing and expansion of nonnative annual grasses and noxious weeds will continue to be a management concern.

Early seral communities dominated by nonnative annual grass stands are in a relatively stable state. These sites are not expected to return to native communities within the next 50+ years without active management intervention.

Shrub Steppe (stiff, low, mountain, Wyoming, and big sagebrush, bitterbrush, mountain mahogany, grease wood, and montane)

The shrub steppe plant community occurs in lower elevations of the Blue Mountain Ecoregion and valley terraces and steeper slopes of the Columbia Plateau Ecoregion. Although western juniper can occur on these sites, fires at 10 to 20 year intervals relegated juniper to a subordinate position in the community or eliminated it altogether.

Disturbance

Drier little sagebrush sites averaged 87 year fire return intervals with replacement fires occurring every 227 years (USDA Forest Service and USDI Bureau of Land Management, 2007a. BPS – 081127 and 091079). Tall sagebrush sites averaged 20 year fire return intervals with replacement fires occurring every 90 years. Typical patch sizes ranged from 10 to 2,000+ acres (USDA Forest Service and USDI Bureau of Land Management, 2007a. BPS – 091125, 081125, and 081080). Burrowing animals and their predators likely played important roles in creating small-scale patch patterns (Johnson and O'Neil, 2001 pg. 51).

Conditions/Influences

Shrub steppe communities were historically a small component of the Columbia Plateau Ecoregion. Patch sizes were smaller and typically tied to micro sites with Wyoming and Mountain sagebrush found on slopes and benches with deeper soils and low and ridged sagebrush on shallower rocky soils. Shrub steppe communities in the Blue Mountain Ecoregion were more extensive. The combination of fire control and historic grazing management has allowed juniper expansion and reduced the quantity and vigor of understory species. Many of these sites have been invaded by nonnative annual grasses or noxious weeds.

Trend

Quigley and Arbelbide concluded that Big Sagebrush and Mountain Sagebrush cover types are significantly smaller in area than before 1900, and that bitterbrush/bluebunch wheatgrass cover types are similar to the pre-1900 extent. More than half of the Pacific Northwest shrub steppe habitat community types listed in the National Vegetation Classification are considered imperiled or critically imperiled (Johnson and O'Neil 2001 pg. 51). Without active management or a change in fire control standards, juniper expansion is expected to continue to invade these communities and decrease the shrub and grass components.

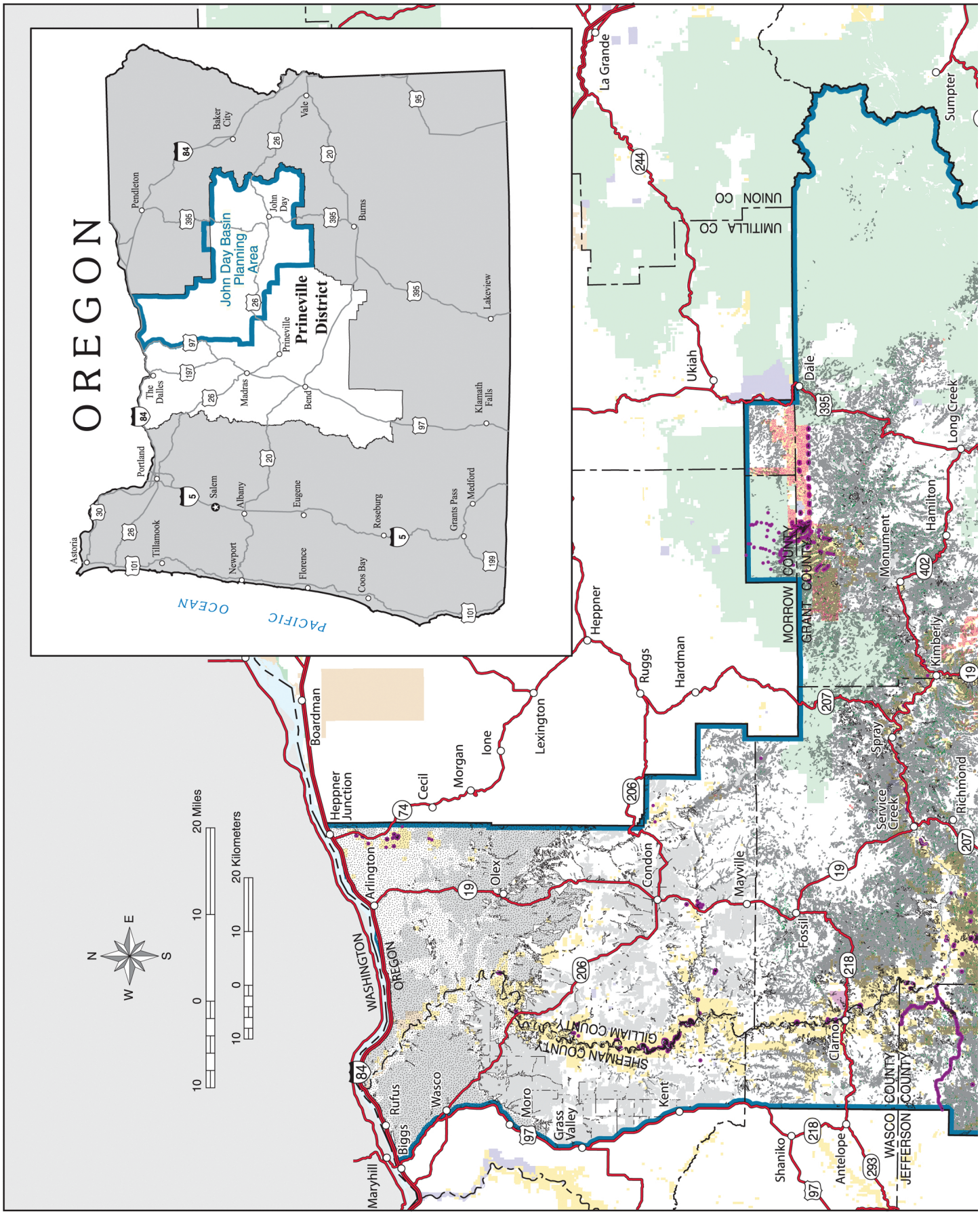
Numerous areas have been converted to annual grass dominated sites (Map 18) with expected trends the same as those in the Palouse Prairie described above.

Western Juniper Steppe Woodland

Western juniper steppe is predominantly found in the Blue Mountain Ecoregion and drainages (particularly north aspects) of the Columbia River Ecoregion.

Disturbance

The presence of old growth stands of western juniper on rocky ridges and along small stream channels is probably a function of the protection afforded by those sites (Burkhardt and Tisdale, 1976). Old growth juniper typically exhibit the following characteristics: flattened, rounded, or uneven top; dead branches; bark missing; covered by a light green lichen; thick fibrous bark with well developed furrows; large branches near the base; and leader growth in the upper ¼ of the tree usually > 1 inch. Growth form and morphological characteristics vary across trees and stands so usually several characteristics are required to separate young and old trees (Miller *et al.*, pg. 12). Typical patch sizes ranged from 100 to 10,000 acres (USDA Forest Service and USDI Bureau of Land Management, 2007a. BPS – 091017). Map 18 displays "old growth" potential and current juniper population extent.


OREGON
John Day Basin Planning Area
Prineville District
Pendleton
Baker City
Vale
John Day
Burns
Prineville
Madras
Bend
The Dalles
Portland
Salem
Albany
Eugene
Roseburg
Grants Pass
Medford
Klamath Falls
Lakeview
Astoria
Tillamook
Newport
Florence
Coos Bay
PACIFIC OCEAN
La Grande
Sumpter
UNION CO
UMATILLA CO
Ukiah
Dale
Long Creek
Hamilton
Monument
Kimberly
Spray
Richmond
Service Creek
Heppner
Ruggs
Hardman
MORROW COUNTY
GRANT COUNTY
Boardman
Lexington
Ione
Morgan
Cecil
Heppner Junction
Arlington
Olex
Condon
Mayville
Fossil
Clarno
Kent
Grass Valley
Moro
Wasco
Rufus
Biggs
Maryhill
WASHINGTON
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GILLIAM COUNTY
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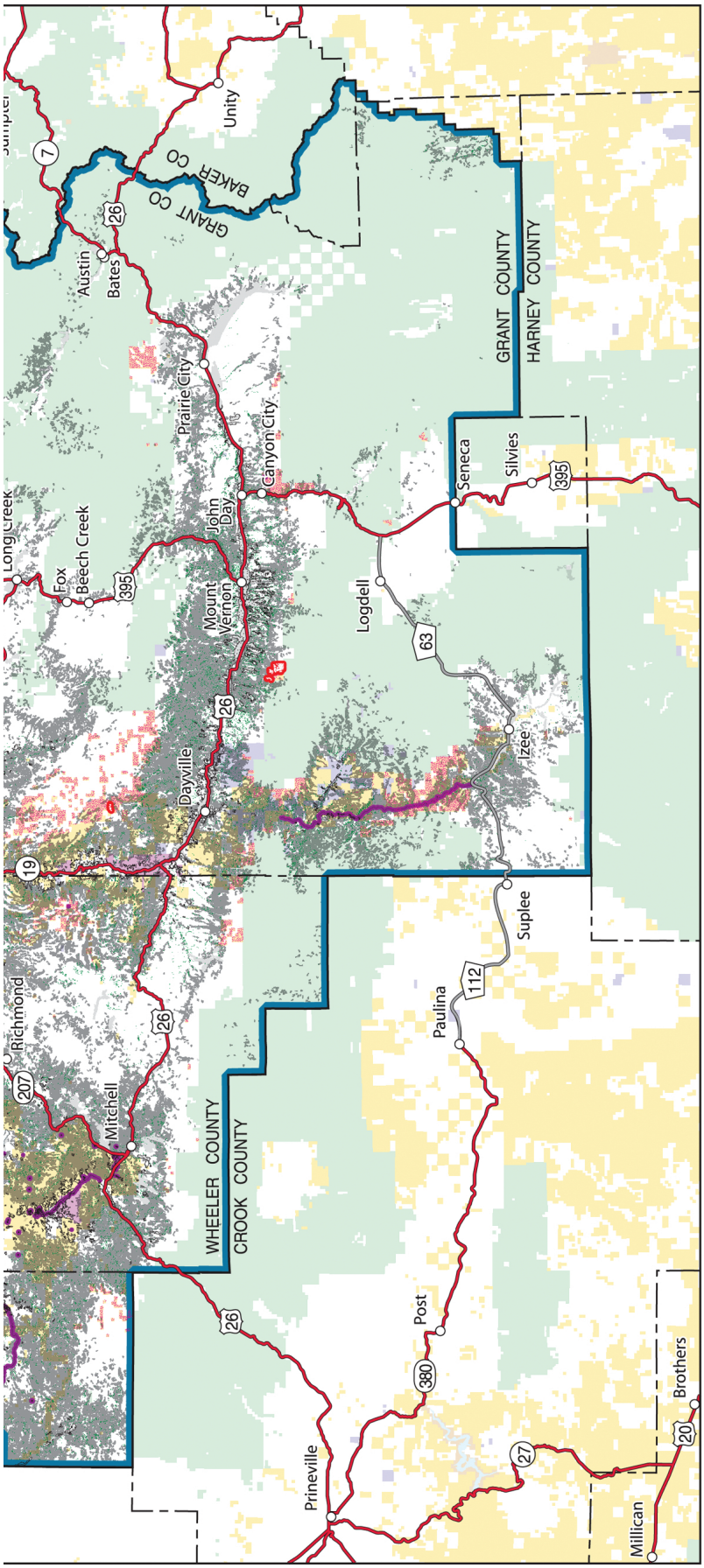

LEGEND

- Large Structure Trees
- Known Weed Location (incomplete coverage)
- Forested
- Potential for Old Growth Juniper
- Juniper Expansion
- Agriculture
- Greater then 25% Annual Grass
- Planning Area Boundary

Administered Land

- Bureau of Land Management
- Forest Service
- John Day Fossil Beds National Monument
- Other Federal
- State
- Private or Other

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

PRINEVILLE DISTRICT
John Day Basin
Resource Management Plan
Draft Environmental Impact Statement
2008

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

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Map 18: Key Vegetation Elements

Conditions/Influences

Over the past 150 years, with fire suppression, overgrazing, and climatic factors, western juniper has increased its range. Inland Woodlands are significantly greater in extent than before 1900 (Miller and Rose, 1999). As these sites become dominated by juniper, understory species cannot thrive. In their absence natural fire can burn through these stands only under the most severe conditions.

Trend

Given the current fire control policies it is expected that without active intervention juniper will continue to expand. The majority of juniper within the analysis area became established within the last 100 years. The majority of these stands are reaching a state where juniper dominance is beginning to alter understory conditions. In the last 10 years private land owners and the BLM have begun to control juniper densities.

Dry Forest (Ponderosa Pine, Mixed Conifer, Douglas Fir)

The majority of forest vegetation occurs within the Dry Forest vegetation group (receives 12-17" of precipitation annually). Dry forests are defined as forests that were historically open and supported widely spaced large ponderosa pine, western larch, and Douglas-fir in the overstory with little underbrush and only occasional clumps of smaller trees. These plant communities occur primarily in higher elevations and drainages of the Blue Mountain Ecoregion.

Disturbance

The mean fire interval ranges from 48 years in drier pine sites, 6 years in moister pine sites, and 20 years in mixed conifer sites with replacement fires in all groups occurring in the 130 year range (USDA Forest Service and USDI Bureau of Land Management, 2007b. BPS – 081053x, 081053m, and 081045). Insects and disease created small openings and altered stand structure with some agents targeting overstory trees and others thinning understory trees. Typical patch sizes: Small openings (<2 acres) emulate spots created by low intensity fire, root rot, pockets, or insect disturbances.

Conditions/Influences

Forest stands in dry forest climates are generally limited by low moisture and are often subject to drought. Dry forests can also be affected by limited nutrients and/or competition stress. Fire suppression has allowed understory densities to increase with a corresponding species shift to more shade tolerant species. These vegetative communities were also historically logged in a manner that removed the large tree (Old growth tree, see glossary) component. Many of the remaining large trees are being stressed by understory competition and subject to higher risk of insect and disease, stand replacement fire, and drought. Stands of large diameter ponderosa pine with an open understory are one of the most limited conditions in the Columbia Basin. Many of the pure ponderosa pine stands have been converted to mixed conifer stands with understories of Douglas fir and white fir. In addition, the vegetation inventory shows that slash loads range from 5-80 tons per acre. The average slash load range is 20-30 tons per acre. This is much higher than the John Day RMP recommended limits of 12-15 tons per acre. "With heavy ground fuels and high tree densities, these dry forests are now much more likely to have severe fires" (USDA FS Science Update, p.5, Sept., 2002).

The majority of forest stands within this planning area contain a large tree component; however stands are not dominated by large trees (Vidourek, 2005). This can be attributed to the fact that past green tree management projects did not remove 30-50% of the healthy large trees on site. However, there are few stands that are primarily composed of large trees. Basal areas ranging from 80-400 square feet per acre were identified during the forest vegetation inventory (Vidourek, 2005). The average basal area across the planning area is 160-200 square feet per acre.

Trend

As a result of this trend of high basal areas, trees have become stressed and are succumbing to insects and diseases (Vidourek, 2005). Insect populations have reached epidemic populations in scattered stands across the

planning area. As the trees die and fall to the ground the stands are accumulating excessive slash loads and becoming more susceptible to wild fires.

"A large number of mixed conifer stands in the Blue Mountains have been severely damaged by a variety of insects and diseases, compounded by protracted drought, overstocking, and inappropriate past management." "Additionally, large areas in the ponderosa pine type are drastically overstocked and in imminent danger of a bark beetle population buildup and resultant epidemic" (Schmitt and Scott, 1993). Insect populations throughout the planning area are spreading each year. Due to passive forest management over the past nine years, insect disturbances are being left unchecked. As a result, many forest stands are losing trees including the larger size trees that were left for seed sources during past management treatments. "Once an outbreak begins, beetles select the largest trees in a stand. The natural resistance of trees and stand to attack by mountain pine beetles decreases as age and competition increase" (Gast *et al*, 1991 p.46). "When bark beetle mortality reduces stand density in unthinned stands, some of the best trees are lost, and the mortality often occurs in clumps, resulting in uneven distribution of growing space among remaining trees" (Cochran *et al*, 1999).

Currently large diameter components of these communities are at high risk of increased mortality.

Moist Forest (Mixed Conifer, Douglas Fir, White/Grand Fir, Spruce, and Lodgepole Pine)

Some of the forest stands are pure or single species stands, but the majority are mixed stands to varying degrees. In general these communities occur in large stands; however ponderosa pine and Douglas fir occur as isolates and stringers associated with drainages. The Viable Ecosystem Guide developed by the Ochoco NF recommends – forest stands that are contiguous and at least 1,000 acres in size. Small openings (<2 acres) emulate spots created by low intensity fire, root rot, pockets, or insect disturbances. Large patches (500+ acres) simulate large stand replacement fires. These openings occurred at 70-200 year intervals (USDA Viable Guide, 1994 pg. 47 and 31).

Lodgepole Pine – The ecological status of lodgepole pine is typically that of a pioneer or invader species and is normally seral to other tree species such as ponderosa pine grand fir, or Engelmann spruce. It thrives on disturbance and can establish quickly in an area ravaged by fire, windthrow, insects or disease. This short lived species is dependent on disturbance for its regeneration, health and vigor with a fire return interval of 80 to 100 years (USDA Forest Service and USDI Bureau of Land Management, 2007a. BPS – 091050).

Disturbance

In moister areas including riparian associations stand densities may reach levels where insect and disease episodes had localized effects to stand dynamics including the removal of the largest trees. Dwarf mistletoe could be significant in those stands where their host species are abundant. Dwarf mistletoe alters stands by killing heavily infected overstory and restricting development of host understory trees. Fires were probably of moderate frequency (30-100 years) in presettlement times. Typical stand-replacement fire-return intervals are 150-500 years with moderate severity-fire intervals of 50-100 years. Generally, wetter sites burn less frequently and stands are older than drier sites (Johnson and O'Neil, 2001 pg. 33). Hall (1976, 1980) estimates that natural under burns occurred every 10 years in drier sites of the Blue Mountains. Stands which occur on mid and upper slope positions had more frequent fires than stands in a toe slope or lower slope position (USDA Viable Guide, 1994).

Conditions/Influences

The majority of these communities are overstocked with high levels of ground fuels. In addition, the vegetation inventory shows that slash loads range from 5-80 tons per acre. The average slash load range is 20-30 tons per acre. This is much higher than the John Day RMP recommended limits of 12-15 tons per acre. "With heavy ground fuels and high tree densities, these dry forests are now much more likely to have severe fires" (USDA FS Science Update, p.5, 2002).

Trend

Many of these stands have a high risk of stand replacement fires, insect loss, and loss of large tree components due to competition stress.

Unique Features

- 1 Riparian associations in the drier areas of the Columbia Ecoregion provide unique diversity.
- 1 Palouse Prairie communities in the Lower John Day provide key habitats for sensitive species and are some of the last remaining in the Columbia Basin.
- 1 Two unique areas exist for the forest vegetation. Both contain the oldest and largest trees within the planning area (See Map 18) One is located in Timber Basin (less than 500 acres) at the south base of Rudio Mountain and the other is isolated near the north face of Aldrich Mountain (Big Canyon Creek-approximately 1100+ acres). The Timber Basin size was reduced significantly by the Timber Basin wildfire in August, 2000. Both areas are similar and are the closest resemblance of a stand exhibiting some old multi-story forest (old growth forest, see Glossary) characteristics. They have some trees (ponderosa pine and Douglas fir) in excess of 40 inch DBH in the overstory and both have an understory of mixed conifer (both shade-tolerant and shade-intolerant).
- 1 Old growth juniper stands associated with rocky rims along the main stem of the John Day River north of Picture Gorge.
- 1 Aspen and black cottonwood stands associated with the main stem, North, South, and Main stem of the John Day River, drainages, and springs.
- 1 Western Larch communities require a unique set of disturbance conditions to become established. Currently population levels are declining.

Regional Context

Vegetation patterns and trends within the planning area are generally consistent with findings in ICBEMP (Jones, and Hann, 1996) and other regional reviews which included:

- 1 Overall, more forest cover types are dominated by shade-tolerant species that are generally more susceptible to fires, insects and pathogens; and fewer forest cover types dominated by shade-intolerant species that are more resistant to fire, insects, and pathogens.
  - 1Significant increases of grand fir/white fir, and Interior Douglas-fir were observed.
- 1 The large tree component is believed below historic levels in the ICBMP area.
- 1 Pole-sized seral/structural stages are found in greater abundance than at any time during the last several hundred years.
- 1 Increases of the croplands and grand fir/white fir cover types, and declines of the fescue bunchgrass and Interior ponderosa pine types.
  - 1Agricultural conversion of 46 percent of the big sagebrush, 79 percent of the Agropyron bunchgrass, and 91 percent of the fescue bunchgrass cover types.
- Conifer and juniper expansion into shrubland habitats was the predominant factor responsible within 46 percent of the subbasins in which the upland woodland community type occurred above its historical range (Jones, Hessburg, Smith, 1996).
  - 1Western juniper woodlands in eastern Oregon with more than 10 percent canopy cover increased from 456,000 acres in 1936 (Cowlin *et al.*, 1942) to 2.2 million acres in 1988 (Gedney *et al.*, 1999). In much of its range, western juniper occupies 10 times the area it did 130 years ago (Miller *et al.*, 1999).
- The introduction of European annual grasses has drastically altered disturbance regimes, moisture and nutrient capture capabilities, and habitat suitability.
- Significant declining trends of cottonwood/willow, interior ponderosa pine, and western larch were observed.
- 1 Fragmentation of landscape patterns of subwatersheds within the Blue Mountains and Columbia Plateau increased between historical and current periods.
- 1 The greatest fire regime changes are associated with the dry forest vegetation types, such as ponderosa pine and Douglas-fir, and in shrub lands, such as mountain big sagebrush and big sagebrush. Fire severity has increased in all of these vegetation types. Fires have become less frequent (due to fire suppression) and more severe. Non-lethal fire regimes have become mixed-severity (a combination of stand-replacing

and non-lethal fire effects) fire regimes and mixed severity fire regimes have become increasingly stand-replacement fire regimes. Mixed-severity and stand-replacement fire regimes are extensive.

Special Status Plants

Special status plants include those species listed by BLM as "Sensitive" (BLM OSO, 2007) as well as plants listed by either the federal or state governments as "endangered" or "threatened" (Oregon Natural Heritage Information Center, 2007). Plants so designated include species that are rare or uncommon, and face possible extinction or endangerment throughout all or a significant portion of their range (or within the State of Oregon), and for which special consideration and/or management is needed. Appendix D lists special status plants documented or suspected within the planning area. There are no federally-listed Endangered or Threatened plants known or suspected within the planning area.

These plants occupy small, usually isolated and scattered sites across the planning area, although three main locales have a greater site density: the South Fork of the John Day River, BLM lands between Service Creek and Kimberly; and the Sutton Mountain area. Table 3-5 shows acreage by species, as mapped in GIS:

Table 3-5. Special Status Plant Species

Species	No. Sites	Acres Occupied (GIS)			
		Total	Average	Minimum	Maximum
Arrow-leaf thelypody	46	74	2	<0.01	9
Dwarf suncup	1	1	1	1	1
Transparent milkvetch	22	351	15	<0.01	64
Total All Species	69	426			

Of the three species known to occur on BLM lands within the planning area, two (transparent milkvetch and arrow-leaf thelypody) are endemic to the John Day Basin and the BLM plays an important part in their conservation. Oregon sites of the dwarf suncup, known also from eastern Washington and Idaho, are found predominantly in the John Day Basin as well.

Special status plant sites on BLM lands in the John Day Basin planning area are generally in stable condition. Of the 69 sites above, 68% are stable, 10% are in downward trend, 3% are in an upward trend and for 19%, the trend has not been determined. Assessment is accomplished through periodic monitoring visits which include counts of plants on site and a qualitative evaluation of their vigor, reproductive status and apparent threats.

Isolated downward trends appear to be the result of natural causes, such as long-term drought, soil slippage and flooding. Unless determined to be caused by natural phenomena, downward trends may be corrected through changes in management. Some examples of this could be implementing a change in livestock use, closures of roads and/or trails, removal of competing vegetation, weed control, fire treatment, and similar management prescriptions.

Only one site, for which there is an apparent downward trend, requires a change in the management of the site, and this is related to the need for a small, site-specific livestock exclusion fence.

Due to the inaccessible and/or inhospitable habitat occupied by the dwarf suncup and transparent milkvetch, it is unlikely these species have ever been more numerous or in better condition than they are today. However, the arrow-leaf thelypody occupies riparian and related habitat, much of which has been altered since European settlement. Remaining sites are mostly in areas relatively inaccessible to livestock and it is likely there is suitable habitat that remains unoccupied for whatever reasons.

Of those species listed in Appendix D, only Laurence's milkvetch is likely to have occurred on BLM land within the John Day Basin and has since been extirpated from public lands. Sightings have not been recorded since the 1950s.

Special status plants contributed to the finding that botanical values are an outstandingly remarkable value of the John Day River, resulting in its designation as a Wild and Scenic River. The transparent milkvetch is found in Segment 10 and is suspected to occur in Segment 11. Arrow-leaf thelypody is found within Segments 3, 4, and 6 and is suspected to occur in Segments 10 and 11.

Noxious Weeds

Noxious weeds and expansion of some native species (e.g., juniper) are increasing problems within the John Day Basin (BPA 2005). The rapidly expanding occupation of the John Day Basin by noxious weeds represents the single greatest threat to native rangeland biodiversity and recovery of less-than-healthy watersheds (DiTomaso, 2000). The initiation and spread of noxious plants have been furthered by human disturbances such as recreational use, grazing management, and fire suppression. Native bunchgrasses have been depleted in many areas as the range of the western juniper expanded. Exotic annual grasses such as cheatgrass and medusahead have filled the niche formerly occupied by the perennial grasses.

"Noxious" is a legal classification rather than an ecological term. Plants that can exert substantial negative environmental or economic impact can be designated as noxious by various government agencies. Noxious weeds affect livestock grazing, recreation, timber production, and wildlife and scenery viewing by displacing native plant species and lessening natural biological diversity; degrading soil integrity, nutrient cycling, and energy flow; and interfering with site-recovery mechanisms, such as seed banks, that allow a site to recover following disturbance (Quigley and Arbelbide 1997).

The weeds causing the most concern in the John Day Basin are diffuse, spotted and Russian knapweeds, Dalmatian toadflax, yellow star-thistle, clasping pepperweed, leafy spurge, tamaris, Scotch cottonthistle, purple loosestrife, rush skeletonweed, leafy spurge, white top, wavyleaf thistle, puncturevine, poison hemlock, and medusahead.

Weeds of special concern are those beginning to occupy very small niches with just a few plants along the high water lines, and small patches on islands (mainly diffuse knapweed and Dalmatian toadflax) that could spread very rapidly. Also, small infestations of Russian knapweed and Dalmatian toadflax are becoming more prevalent on the upper, sheltered alluvial flats. This is especially noted on almost all riparian zones below the confluence of Thirtymile Canyon at RM 84, but a few plants of purple loosestrife and rush skeletonweed have also been found and hand pulled. In the Clarno area, medusahead is common on the west side of the river to the north and south of Highway 219, in previously burned areas. It is also prevalent in the Murderer's Creek drainage and in clay soils across the basin. Diffuse knapweed is found along the road right-of-way, south of Clarno. Russian knapweed is also very prevalent in the Clarno and Bridge Creek areas, and has also been found in many very small patches along the river almost always on the upper alluvial flats. Dalmatian toadflax is also found on these flats and is beginning to move up slopes in a few spots, especially below Thirtymile Canyon. Chemical control of Dalmatian Toadflax in the John Day River system is quite difficult where access is limited. The thistles (Scotch, bull, and Canada) and poison hemlock are found most commonly at the small tributaries near and in riparian areas. Yellow starthistle has been found in several locations in the Clarno area and is especially prevalent in the upper Bridge Creek area near Mitchell. It is also prevalent near the Columbia River at Biggs and Horn Butte.

The BLM Prineville District coordinates weed prevention, detection, and control efforts with the local County Weed Boards, ODA, ODOT, National Forests, local Soil and Water Conservation Districts, as well as private land owners and neighborhood community groups. The BLM's Partners Against Weeds Strategic Plan highlights cooperative partnerships to control and manage invasive and noxious weeds. BLM is a partner in the Bridge Creek Cooperative Weed Management Areas. The BLM has six agreements with the counties in the planning area. The BLM uses these partnerships to combat invasive weeds and conduct inventories.

Fuels

Fire Ecology

Fire ecology is concerned with linking fire processes and the ecological effects to vegetative communities and organisms. Fire is an integral component to the function of many vegetative communities (BpS) and the organisms that rely on them. The combination of numerous variables (slope, aspect, elevation, precipitation, etc.) influences the types and characteristics of vegetation and disturbance patterns on a given site. The primary disturbance element in most BpSs is fire, which is described in terms of fire regime. A fire regime describes the typical fire frequency and severity that fire follows in a particular BpS. The five fire regimes are described below:

Fire Regime 1	0 to 35 year frequency; low intensity (i.e., pine)
Fire Regime 2	0 to 35 year frequency; high intensity (i.e., rangeland)
Fire Regime 3	35 to 200 year frequency; mixed severity (i.e., mixed conifer)
Fire Regime 4	35 to 200 year frequency; lethal severity (i.e., dry range types)
Fire Regime 5	200+ year frequency; lethal severity (i.e., high elevation)

Fire Regime Condition Class (FRCC) is an estimate of the degree to which current landscape conditions have departed from historical reference condition vegetation and disturbance regimes (Hann *et al.* 2004). Assessing FRCC can help guide management objectives and set priorities for treatments. The classification is based on a relative measure describing the degree of departure from the historical natural fire regime. This departure is evidenced by changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern) and fuel composition. The departure of these conditions results in altered disturbance (e.g., fire, insect, and disease) frequency, severity, and pattern.

FRCC classes serve as generalized ecological risk rankings. The risk of loss of desired ecological conditions due to too little or too much wildland fire, or to uncharacteristic vegetation structure or composition increases from Fire Condition Class 1 (lowest risk) to Fire Condition Class 3 (highest risk) within a given fire regime (Hann *et al.* 2004).

Table 3-6 displays Vegetation types (BpSs) their respective fire regime, current acreages, and most prominent Fire Regime Condition Class.

Fifty-three percent of the planning area is dominated by vegetation types that characteristically have low frequency, lethal severity fire regimes (fire regime type 4). Another 24% and 14% are dominated by vegetation types having fire regime types 3 and 1, respectively (See Figure 3-14 Percent of Area by Fire Regime.

Figure 3-14. Percent of Area by Fire Regime

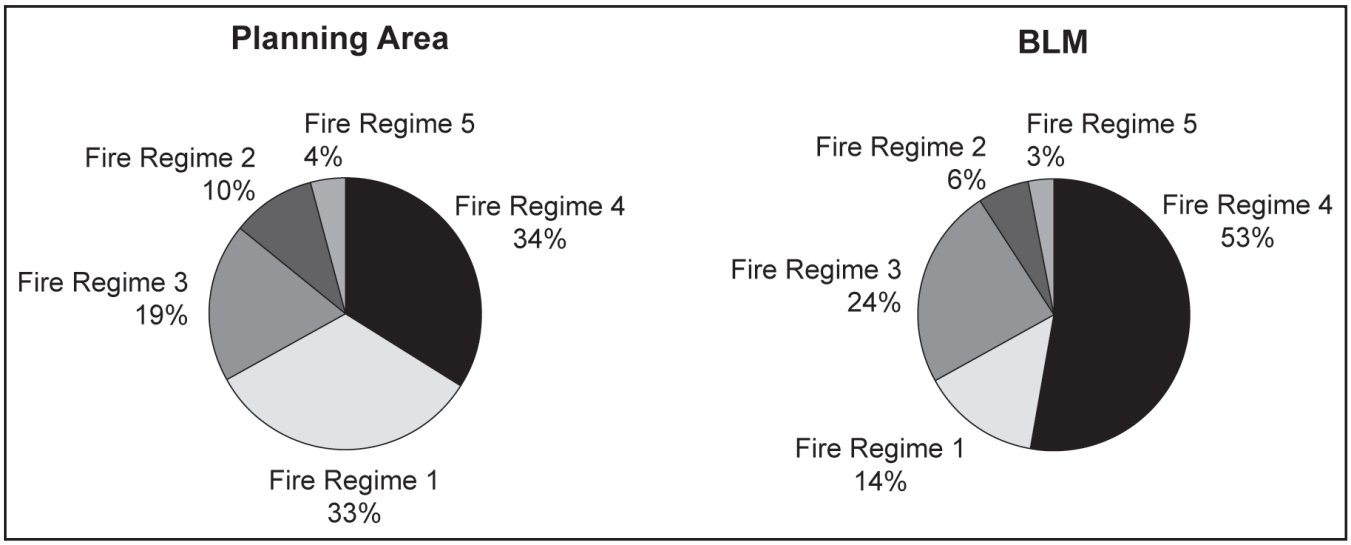


Table 3-6. Distribution of Fire Regime Types and Fire Regime Condition Class by Biophysical Setting for the John Day Basin Planning Area

Biophysical Setting (Vegetation Type)	Fire Regime Type	Total acres in planning area	Acres of BLM lands in planning area	FRCC in planning area (all jurisdictions)
Wyoming Big Sagebrush Semi Desert with Trees	4	7,863,506	162,848	2
Inter-Mountain Basins Big Sagebrush Shrubland	3	2,381,546	69,075	3
Inter-Mt. Basins Semi-Desert Grassland	4	1,269,550	39,381	2
N. Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest	1	7,869,256	36,661	3
N. Rocky Mt. Ponderosa P. Woodland Mesic	1	3,562,151	25,930	3
Columbia Plateau Steppe and Grassland	2	2,561,627	18,611	2
Mountain Big Sagebrush with Conifers	4	1,142,418	16,784	2
Columbia Plateau Low Sagebrush Steppe	4	594,082	12,623	3
Stiff and Low Sagebrush with Trees	3	1,246,033	10,990	2
N. Rocky Mt. Ponderosa Pine Woodland-Xeric	3	798,408	10,355	2
Juniper Steppe Woodland	3	321,563	8,149	2
Rocky Mt. Montane Riparian System	3	909,267	6,361	3
Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland	2	849,002	6,239	3
Columbia Plateau Scabland Shrubland	5	490,732	6,169	3
Inter-Mountain Basins Montane Riparian Systems	5	851,190	6,149	3
Inter-Mountain Basins Mountain Mahogany W & S land	4	107,502	3,112	1
Riparian Systems	3 to 5	84,038	1,973	2
Northern Rocky Mountain Western Hemlock-Western Red Cedar Forest	3	576,953	1,000	1
Rocky Mt. Subalpine/Upper Montane Riparian Systems	3	337,113	751	1
Rocky Mountain Supalpine-Montane Mesic Meadow	2	69,226	600	3
Rocky Mountain Poor Site Lodgepole Pine Forest	4	125,246	473	3
Inter-Mt. Basins Greasewood Flat	5	3,571	67	3
Northern Rocky Mountain Subalpine Dry Woodland and Parkland	3	111,282	25	1
Rocky Mt. Subalpine Dry-Mesic Spruce Forest	4	446,529	2	2

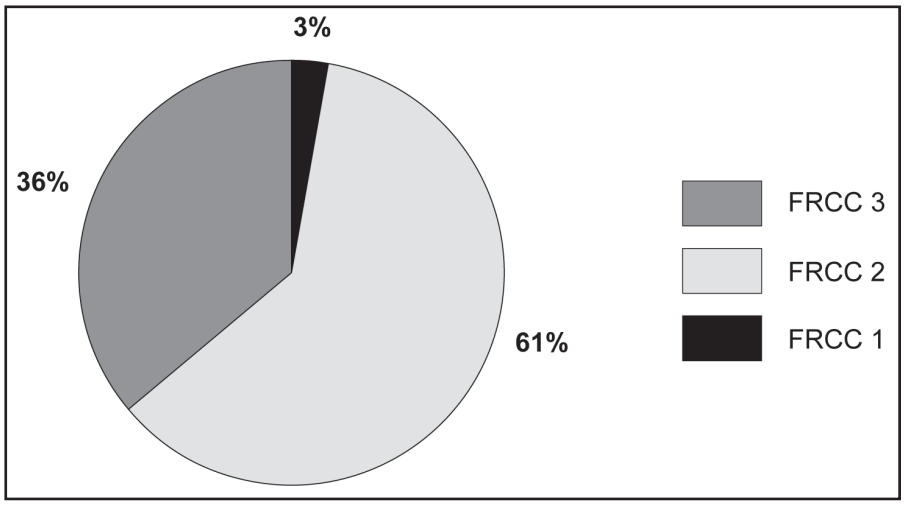
Figure 3-15 and Table 3-6 indicate that about 97% of BLM managed lands within the planning area are in Condition class 2 or 3.

FRCC is similar between BLM lands and those not managed by BLM. The majority of the landscape is in FRCC 2 and 3 regardless of jurisdiction. Of note is the extreme departure within the Columbia Basin primarily due to agricultural conversion. While conditions on BLM lands are similar to those seen on surrounding lands, BLM has the potential to influence approximately 8% of the land base within the planning area.

In general most shrub steppe/juniper habitats are in Condition Classes 2 and 3. Most of the forested lands are in Condition Class 3. Many of the grass habitats on BLM managed lands have missed one or more disturbance

events; however, the vegetative characteristics and fire intensities have not substantially changed. Native grasses have been replaced by non-native annual grass expansion, noxious weeds, and agricultural conversion. These conditions would put these lands in the Condition Class 3 rating. These sites would require extensive management actions (restoration treatments) to allow them to function appropriately after disturbances such as fire.

Figure 3-15. Fire Regime Condition Class on BLM Lands Across the John Day Basin Planning Area



Fire

Fire and Fuels resource in the John Day Resource Management planning area are managed as part of the Central Oregon Fire Management Service (COFMS). The COFMS organization facilitates full collaboration between the federal, state, and local agencies and private entities, resulting in a mobile fire management work force available to the full range of public needs. Fire suppression and fuels treatment objectives from the various land use plans within the COFMS boundary have been incorporated into the 2004 COFMS Fire Management Plan. Fire Management Units (FMU) are identified as a way to place information about specific fire risk, priorities for suppression and fuels treatments, and operating procedures for like conditions within the COFMS boundary, they are not land use allocation. Information pertinent to the John Day Basin planning area is listed below for each of the six FMUs.

Six Fire Management Units (FMU) have been identified throughout COFMS (see Figure 3-16: Central Oregon Fire Management Plan—Fire Management Units). These FMUs provide context for fire management and may be modified as conditions change. FMUs do not constitute planning decisions.

Fire Management Unit 1 – Wildland Urban Interface (WUI)

Without a Community Wildfire Protection Plan, COFMS defines a default wildland urban interface as the 1.5 mile area surrounding each designated community at risk as well as around critical evacuation routes or other special use areas as by Oregon Department of Forestry. Under the Healthy Forest Restoration Act, Communities at Risk are encouraged to develop Community Wildfire Protection Plans identifying needs to respond to and deal with the threat of wildfires on public and private lands. (See Map 5 Fire Response Zones for the Current WUI areas in Chapter 2)

These plans can increase or decrease the WUI boundary based on community input and risk. The following areas in the project area are considered communities at risk:

The Fossil Beds area is composed of the area surrounding the John Day Fossil Beds National Monument. Vegetation is grass and shrub steppe.

The Monument area is located adjacent to the community of Monument and includes the communities of Kimberly, and Spray. Vegetation is primarily grass and sage with some timbered areas.

The Wheeler area includes WUI associated with the communities of Fossil and surrounding areas. Vegetation is dominated by grass and shrubs.

Other WUI communities include: Antelope, Anton, Arlington, Austin, Big Muddy Ranch, Biggs Junction, Canyon City, Clarno, Condon, Dayville, Grass Valley, John Day, Kent, Long Creek, Mayville, McDonald Crossings/ 1 Rock Creek, Mitchell, Moro, Mount Vernon, Prairie City, Seneca, Service Creek, Shaniko, South Fork John Day, Twickenham, and Wasco.

Community Wildfire Protection Plans (CWPP) have been developed for Grant, Wheeler, and Gilliam counties in the planning area, covering all communities at risk within the county boundaries.

Fire Management Unit 2 – Wilderness and Wilderness Study Areas

This FMU consists of designated Wilderness Study Areas on Prineville BLM District. Vegetation is composed of grass/shrub lands with timbered slopes of juniper and ponderosa pine. WSAs are South Fork, Thirty Mile, North Pole Ridge, and Spring Basin which are vegetated with grass/shrub. The Pat's Cabin, Sutton Mountain, Aldrich Mountain, and Strawberry Mountain WSAs have vegetation composed of grass/shrub lands with timbered slopes of juniper and ponderosa pine

Fire Management Unit 3 – Two Rivers

This FMU consists of lands administered by the BLM, primarily located along the Deschutes and John Day River corridors. The FMU consists of steep canyons associated with the Deschutes and John Day Rivers. Soils are generally shallow with surface rock. Vegetation is dominated by grass and shrubs. Elevation ranges from 2500 to about 500 feet.

Limited road access and irregular land ownership patterns result in poor emergency ingress/egress. The John Day River corridor has a high fire risk and is prone to weedy plant invasion. Much of the BLM land along the John Day River adjoins private lands. The private land (mostly range and farmland) creates an agricultural interface near the river where river access is limited.

Fire Management Unit 4 – Brothers

This FMU consists of lands administered by the BLM, primarily located in the southern and eastern portions of COFMS. A few scattered parcels of land within this FMU are located in the northern portions of COFMS within Sherman and Wasco Counties.

The FMU consists primarily of flat and rolling hill topography. Soils are generally shallow developed from basalt flows, with some areas of thin surface volcanic ash deposits. Vegetation is dominated by sage and other shrubs, perennial and annual grasses, and juniper. Ponderosa pine is present in foothill areas and adjacent to national forest areas. Elevation ranges from 2500 to 3500 feet.

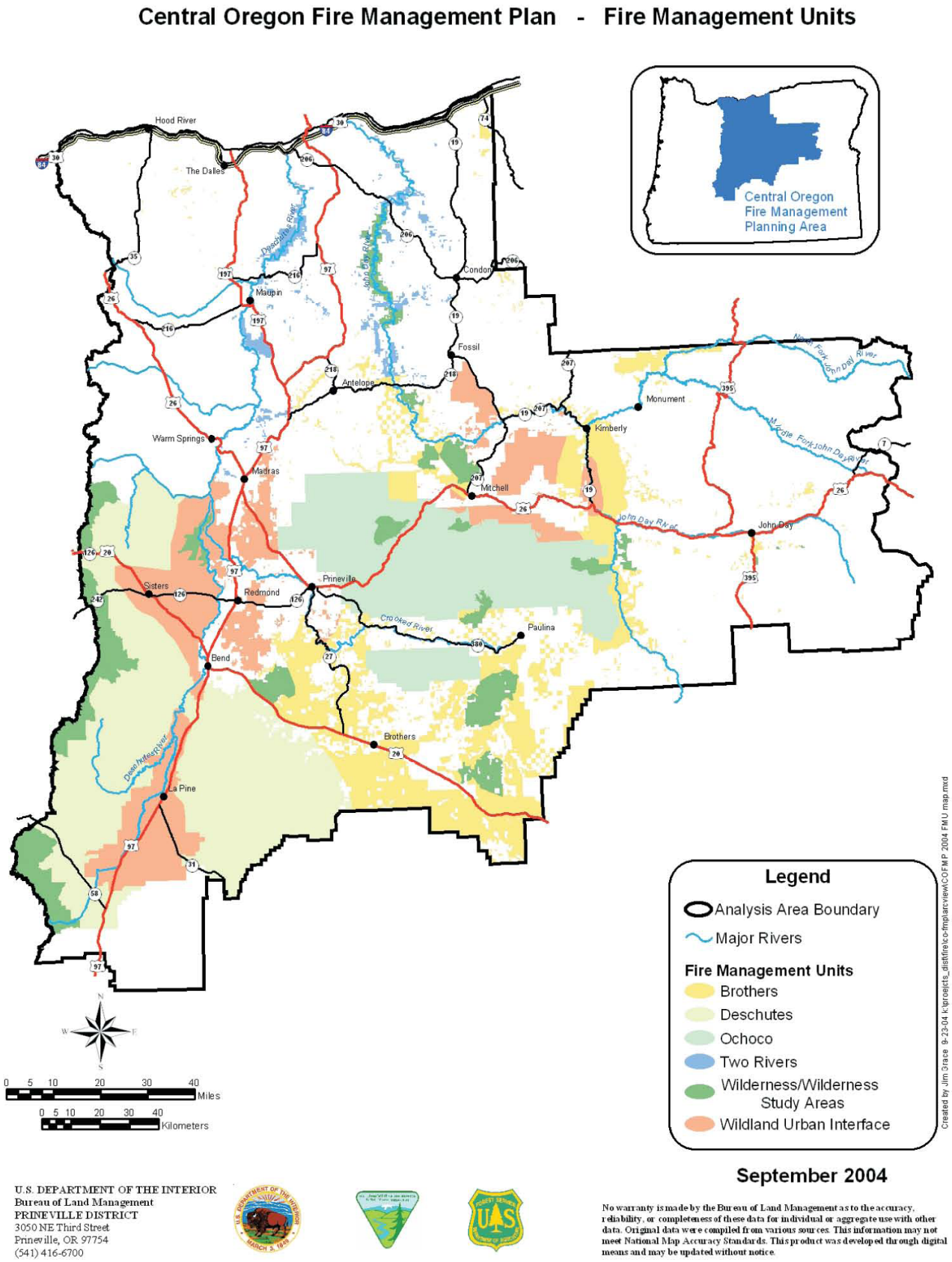
Fire Management Unit 5 – Ochoco

This FMU includes the main portion of the Ochoco National Forest located near the center of the FMU. The FMU is located primarily within Crook, Wheeler, and Grant Counties.

The FMU consists of variable topography, vegetation and fuel types, including abundant ponderosa pine, mixed conifer, juniper and grass/sage. Scab stringer types (rocky areas) are found east of Big Summit Prairie.

Fire Management Unit 6 – Deschutes (Does not occur within the planning area).

Figure 3-16. Central Oregon Fire Management Units



September 2004

U.S. DEPARTMENT OF THE INTERIOR
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Fire Occurrence

Fire Occurrence data below is a summary of the entire COFMS area contained in the Central Oregon Fire Management Plan, consequently it contains data for almost all of the planning are plus much of the Deschutes Basin as well.

Fire Management Unit 1: WUI—there have been a total of 1,101 fires within this FMU during the period 1980 – 2002. The average annual occurrence is 50 fires per year. About 50% of the fires are lightning caused. Forty-three fires have exceeded 100 acres in the last 10 years, and 15 were larger than 1,000 acres. Average annual expected burn acres is about 5,540 acres.

Fire Management Unit 2 – WSA: There have been a total of 781 fires within this FMU during the period 1980 – 2002. The average annual occurrence is 35 fires per year. About 80% of the fires are lightning caused. Twelve fires have exceeded 100 acres in the last 10 years, and 6 were larger than 1,000 acres. Average annual expected burn acres is about 1,250 acres.

Fire Management Unit 3 – Two Rivers: There have been a total of 227 fires within this FMU during the period 1980 – 2002. The average annual occurrence is 10 fires per year. About 51% of the fires are lightning caused. A higher percentage of human caused fires occurs along the Deschutes River due to a railroad line and higher recreation use. Sixty-five fires have exceeded 100 acres in the last 10 years, and 16 were larger than 1,000 acres. Average annual expected burn acres is about 9,380.

Fire Management Unit 4 – Brothers: There have been a total of 648 fires within this FMU during the period 1980 – 2002. The average annual occurrence is 29 fires per year. Fire cause is 84% lightning. Seven fires have reached a size of 100 acres or larger. The largest was a fire in 1998 that reached a size of about 8,000 acres. Expected annual burn area is about 1,700 acres per year.

Fire Management Unit 5 – Ochoco: There have been a total of 1,425 fires within this FMU during the period 1980 – 2002. The average annual occurrence is 64 fires per year. About 75% of the fires are lightning caused. Eight fires have exceeded 100 acres in the last 10 years, and 2 were larger than 1,000 acres. Average annual expected burn acres is about 1,450 acres.

Fuels Treatments

Since National Fire Plan implementation in 2001, the fuels management program, including prescribed burning and mechanical fuels treatments (manipulation of vegetation with chainsaws or other equipment), has steadily increased. Prescribed burning and mechanical fuels treatments for the years 1995 through 2005 are summarized in Table 3-7. For more information on silvicultural treatments of forest fuels see the Forest Products section of this document.

Table 3-7. Fuels Treatments

Year	Prescribed Fire	Mechanical Treatments
1995	2,411	
1996	450	
1997	2,445	
1998	673	
1999	1,034	
2000	725	
2001	12,247	
2002	3,915	63
2003	17,488	100
2004	16,656	2,291
2005	14,665	1,500
TOTAL	**55,221**	**3,954**

Aquatic Resources

Stream Channels and Floodplains

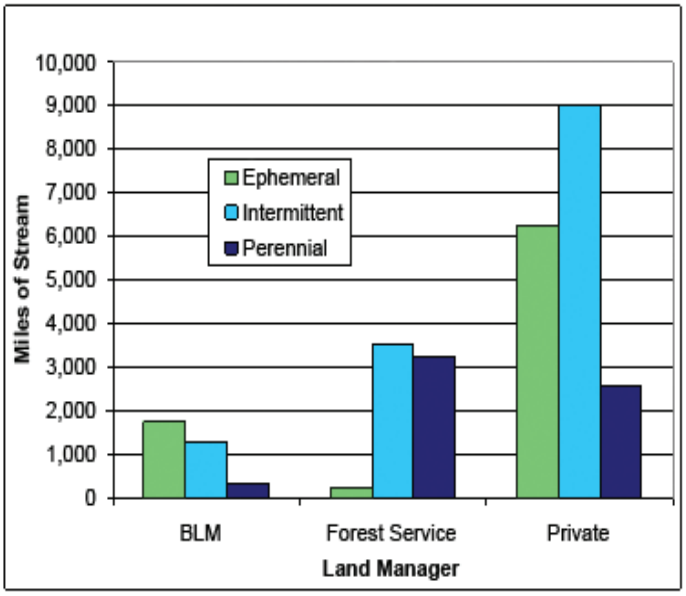
BLM manages land and water in 46 different watersheds in the planning area. The planning area includes 28,000 miles of streams including:

- **Ephemeral** streams which do not flow during an average water year but do flow in response to large precipitation events.
- **Intermittent** streams which flow during spring runoff of an average water year, but generally dry up later in the summer.
- **Perennial** streams which flow some water all year of an average water year.

One third of planning area streams are ephemeral, half are intermittent, and the remainder are perennial.

Figure 3-17 illustrates that BLM manages approximately 1600 miles of intermittent and perennial stream channels within the plan area.

Figure 3-17. Miles of Stream by Land Manager

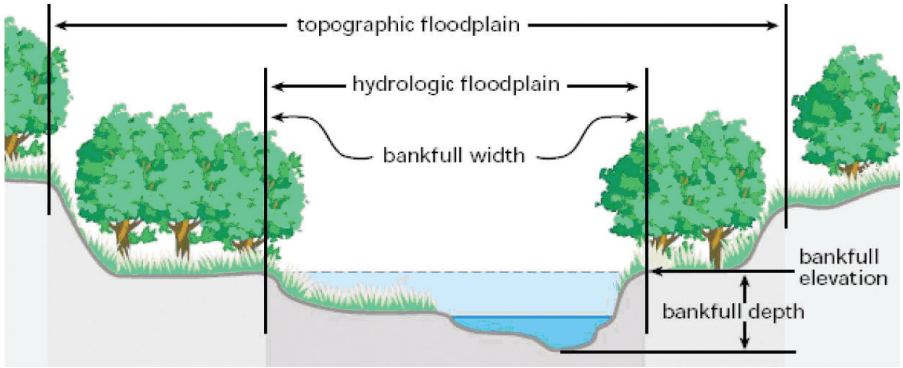


The majority of the perennial stream channels in the plan area occur on National Forest Lands while private land owners own the majority of the intermittent and ephemeral stream channels. This distribution of stream ownership is largely due to the elevation of subject lands across the planning area. The Forest Service manages the headwater reaches and high elevation areas. These areas receive the highest precipitation levels from snow and produce the majority of the water for the planning area. Private land ownership generally lies downhill from Forest Service, but also centers around good perennial water sources that were important when the area was settled. The BLM manages many bottomlands and dry upland hill slopes. Overall, BLM managed land receives the least amount of precipitation of the three major ownerships, about 7 percent. Most of the snowmelt has been funneled into scattered perennial streams and major rivers by the time the water flows down to BLM land. Although BLM ownership is the smallest of the three major landowners, BLM manages many miles of large streams, rivers and floodplains with diverse public values.

Stream channels and flood plains are important because their shape and condition affect how rapidly water flows through a river system, how much water is stored within the basins, how clean the water is, and how much erosion occurs. These functions in turn affect fish and wildlife habitat, agriculture, recreation and the susceptibility of local communities and landowners to floods.

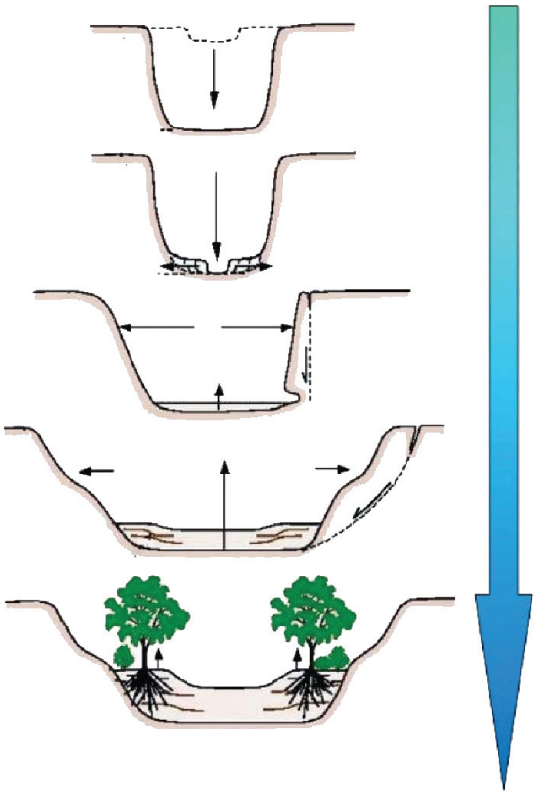
Prior to disturbances such as grazing, mining, and farming initiated during European settlement, the planning area stream channels were generally well vegetated and had frequent interaction with their floodplains (Figure 3-18).

Figure 3-18. Stream Channel and Flood Plain Configuration



As early land management reduced the watershed cover, overland flow of water increased and stream channels deepened to match the increased supply of water and sediment. Major flood events in the late 1800swere the

Figure 3-19. River Channel Evolution



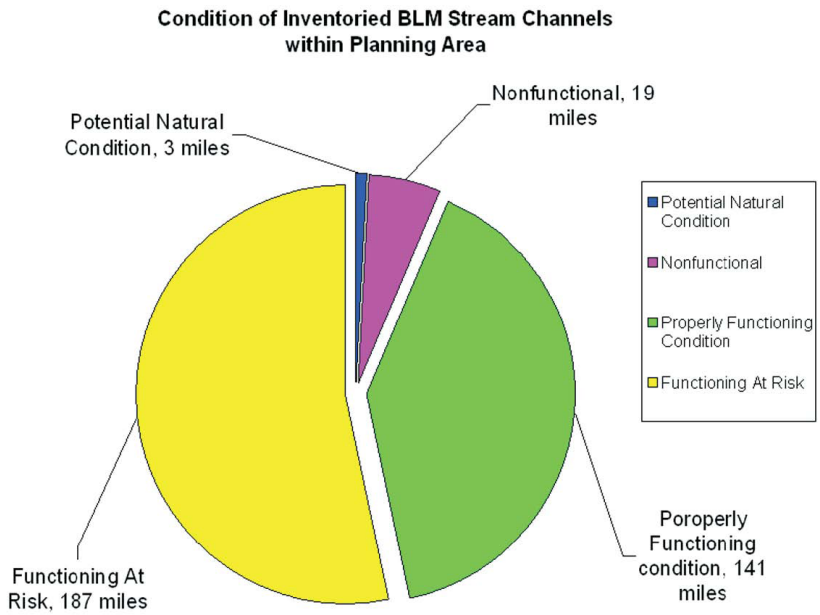
likely immediate cause of the deepening of the channels. Channel incisions eventually lead to bank failures and subsequent channel widening (see Figure 3-19. As channel widening and bank failures continued, a new low-flow channel begins to form in debris from bank failure. Many of the stream channels in the plan area were in the process of this initial buildup in the 1980s.

The result of this process is that new channels are usually lower than predisturbance channels, and the old floodplain now functions primarily as a terrace. Some terraces may be the result of climatic variations and associated changes in flow and sediment supply. The final stage of channel evolution results in a new bankfull channel and active floodplain at a new, lower elevation. Many stream channels in the plan area have new, lower elevation channels and floodplains.

The BLM has adopted Proper Functioning Condition (PFC) assessment (USDI-BLM, 1991c) as a standard for evaluating riparian areas. Streams and wetlands located on BLM managed land have been assessed for condition using the PFC methodology. The PFC assessment employs a consistent approach for considering hydrology, vegetation, and erosion/deposition attributes and processes (Prichard, *et al*., 1998). The assessment of the on-the-ground condition refers to how well the physical processes are functioning.

The majority of BLM stream channels and floodplains within the planning area are not meeting the BLM standard of PFC. On the other hand, relatively few stream channels are non-functioning. More intermittent stream channels are in non-functioning condition than perennial streams, but they also have more miles of stream at potential and PFC. The condition of inventoried stream channels in areas managed by the BLM is displayed in Figure 3-20.

Figure 3-20. Condition of Inventoried Stream Channels

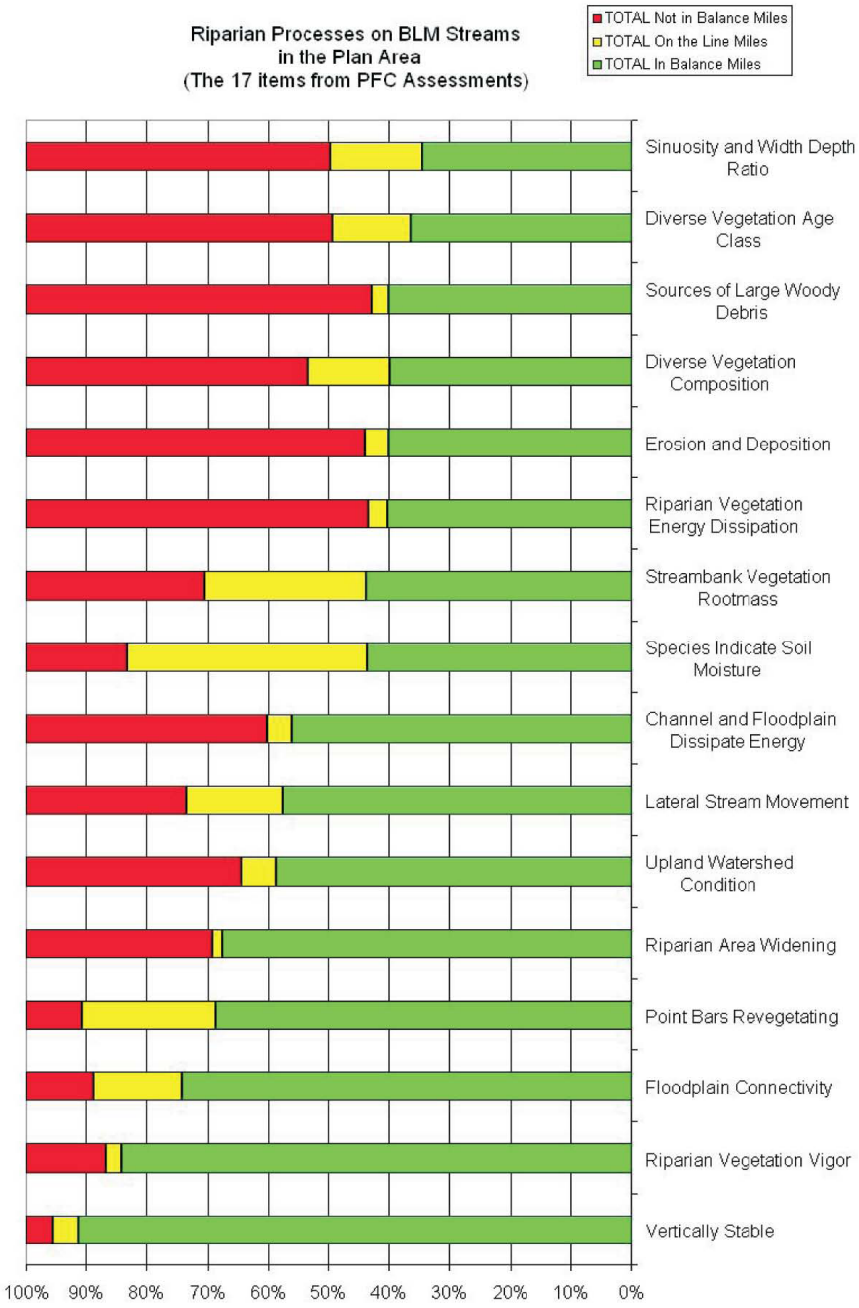


The physical function of stream channels is based on their hydrology, vegetation and erosion/deposition. These physical functions are captured in the 17 question checklist from the PFC inventory (see Figure 3-21). The

physical stream functions are in order from the least to greatest percentage of planning area streams in balance with the landscape.

The upper portion of Figure 3-21 illustrates two generalities about BLM stream channels. First, is the relative youth of restoration efforts in the planning area. Diversity in age class, composition of riparian vegetation and development of dense stream bank root masses are rare. These attributes require consistent management over an extended period, sometimes more than 100 years. A second general observation is the need to reduce stream energy, which can be achieved by restoring sinuosity and width to depth ratios. A majority of stream channels need time to recruit large wood and dense riparian vegetation to dissipate energy.

Figure 3-21. Evaluation of Riparian Processes on BLM Streams



The three processes in the mid portion of Figure 3-21 indicate that many streams are still actively aggrading and widening. Although streams are connected to new floodplains, many of these new floodplains are insufficient for

dissipating stream energy. Insufficient time has passed for large wood and overflow channels to develop under the current system condition. Many upland watershed conditions are still contributing to elevated stream energy, inhibiting the achievement of channel equilibrium.

Physical processes including vertical stability, vegetative vigor, and flood plain connectivity are generally functioning across the landscape. Although there are currently more than 40 active head cuts, most stream channels are vertically stable. Channels down cut during floods more than 100 years ago and many have reached a new equilibrium or intercepted an erosion-resistant layer. Changes in riparian area management over the last 20 years have allowed vigorous riparian vegetation growth, and point bars are revegetating.

Management across the planning area has emphasized riparian area restoration since the Two Rivers and John Day RMPs were signed. Since 1992, efforts to improve riparian habitat have benefited from funding for clean water and watershed restoration. Management of timber, grazing, and road building have emphasized actions compatible with achieving an upward trend in stream channel and floodplain function. These measures have been effective in improving channels and floodplains on BLM managed public land. For example, 63 percent of at-risk riparian areas exhibited an upward trend at the time they were inventoried while only 9 percent of exhibited a downward trend.

In 2005 the condition of streams for which PFC assessments have been completed was compared with condition of the same streams in the 1980 inventory of stream channel condition. The results of the comparison are displayed in Table 3-8.

Table 3-8. Stream Channel Conditions 1980s-2000s

1980 Inventory - 2000s Inventory Class	1980s	2000s
Poor - Non-Functioning	12%	5%
Fair - At-Risk	76%	74%
Good - PFC	12%	21%
Excellent - Potential	<1%	<1%

It is apparent (see Table 3-8) that there has been a slight improvement in condition, but overall stream channels are in Fair or At-Risk condition.

Three stream channels have been identified as being at potential. They are an unnamed tributary to Rudio Creek off Miller Flat, an unnamed tributary to Franks Creek on Scott Creek allotment, and Marks Creek. Streams at potential are extremely rare. For the planning area, less than one percent of all inventoried BLM stream channels have been determined to be at potential. These areas provide important reference areas and bench marks for achieving desired conditions. These areas also serve an important function for wildlife that depend on conditions typical of a later seral stage.

Water Quality

Water quality accounts for the biological, chemical, and physical condition of a water body. Water quality is evaluated based on a water body's ability to support beneficial uses of the water. Generally key water qualities are those that support native fish and wildlife and support human uses such as agriculture, recreation, and domestic water supply.

The Oregon Department of Environmental Quality (DEQ) monitors selected waterbodies for water quality. DEQ has analyzed water quality in the John Day basin between 1995 and 2004. Each site with sufficient data was analyzed for general water quality. Table 3-9 illustrates that the majority of the John Day Basin major rivers have achieved a status of good.

Table 3-9. Oregon Water Quality Index Status and Trends Summary (1994-2004)

Major River Sites	At River Mile	Score out of 100	Category	Trend	Trend Magnitude
John Day River at HWY 206	39.5	80	fair	No Trend	
John Day River at Service Creek	157.4	85	good	No Trend	
North Fork John Day River at Kimberly	0.2	89	good	No Trend	
South Fork John Day River at Dayville	0.2	88	good	Improving	2.5
John Day River upstream of Dayville	215.4	83	fair	Improving	4.6

Many streams within the planning area are designated as water quality limited under section 303 (d) of the Clean Water Act. Section 303(d) requires that each state develop a list of water bodies that fail to meet water quality standards and delineate stream segments and listing criteria for all streams. The specific parameters and stream names of 303 (d) listed streams in the planning area are displayed in Table 3-10 and the streams are displayed in Map 19: 303 (d) Listed Streams.

In general, the water quality concerns expressed for the planning area are similar to the surrounding region. For the John Day River Basin, as with the Columbia River Basin, the major water quality concern has been water temperature. These water temperature concerns correlate to the beneficial use of fish spawning and rearing habitat.

Conditions that affect stream temperature can be grouped as near-stream vegetation, channel shape, and hydrology (see Figure 3-22). Many of these conditions are interrelated and many vary considerably across the landscape. For example, channel width measurements can change greatly over even small distances along a stream. Some conditions vary daily and/or seasonally.

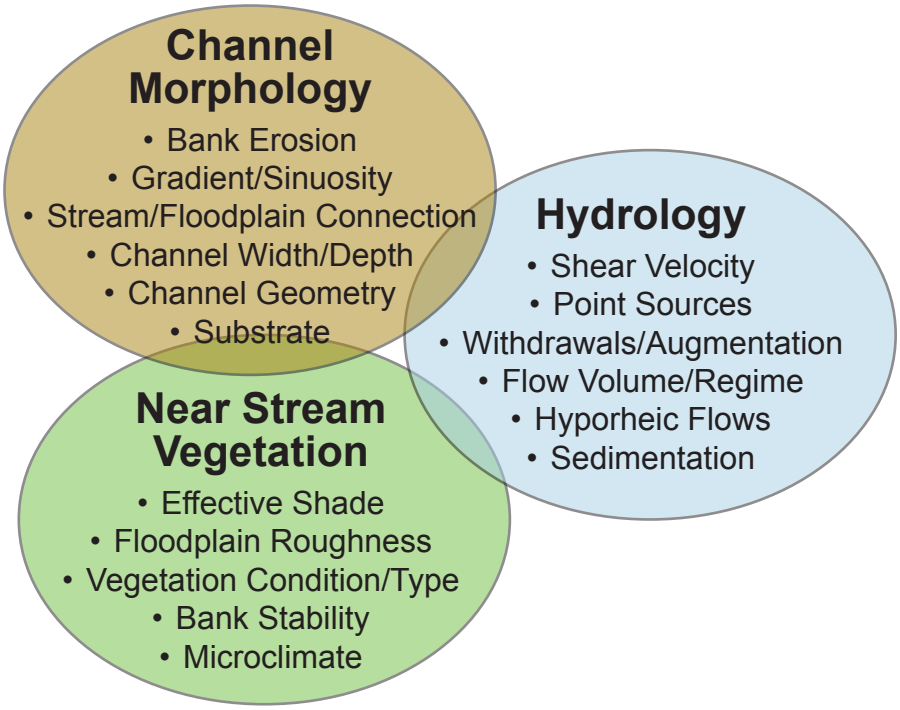
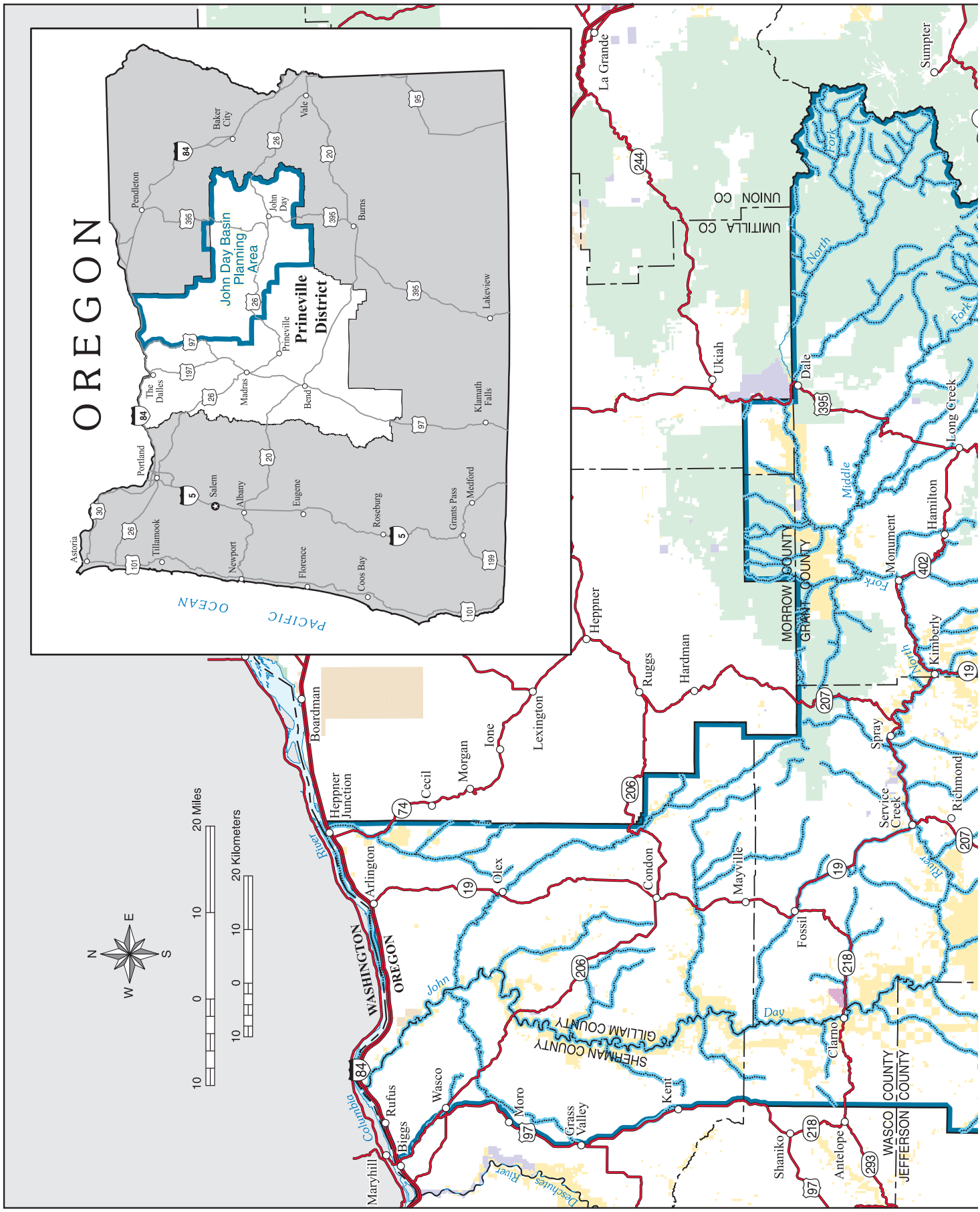


Figure 3-22. Factors that Affect Stream Temperature Dynamic

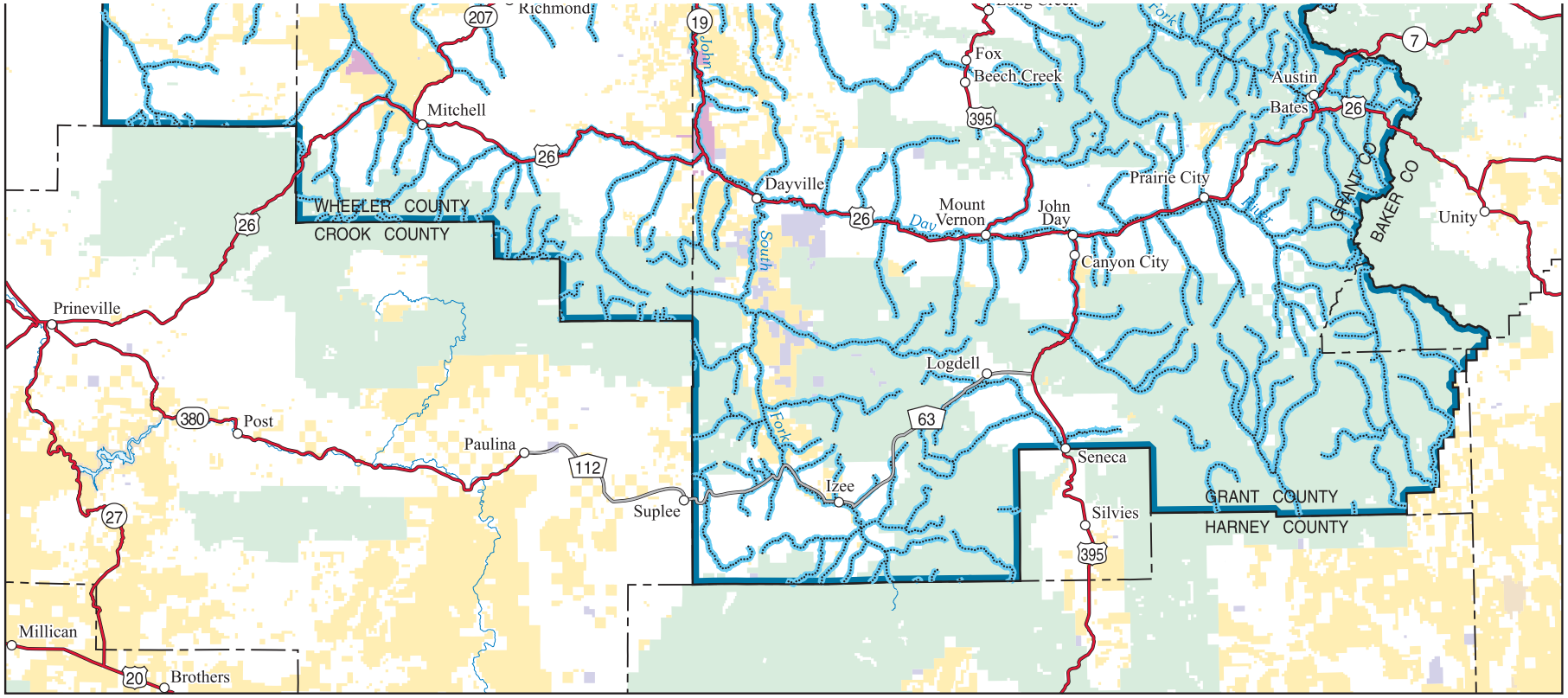
Removal of riparian vegetation and the shade it provides contributes to elevated stream temperatures (Rishel *et al*., 1982; Brown, 1983; Beschta e*t al*., 1987). Channel widening can similarly increase solar loading. The principal source of heat energy delivered to the water column is solar energy striking the stream surface directly (Brown 1970). Exposure to solar radiation can cause an increase in stream temperature. The ability of riparian vegetation to shade the stream throughout the day depends on aspect and vegetation height, width, density and position relative to the stream, as well as aspect the stream flows (streamside vegetation provides less shade on a north or south flowing stream than on an east or west flowing stream).

Table 3-10. 303 (d) Listed Streams

By Waterbody Name with 303d listing Parameters following
John Day River
Dissolved Oxygen for Cold water: Not less than 8.0 mg/l or 90% of saturation
Dissolved Oxygen for Cool water: Not less than 6.5 mg/l
E Coli for 30-day log mean of 126 E. coli organisms per 100 ml; no single sample > 406 organisms per 100 ml
Fecal Coliform for Fecal coliform log mean of 200 organisms per 100 ml; no more than 10% > 400 per 100 ml
Temperature for salmon and steelhead migration corridors: 20.0 degrees Celsius
Temperature for salmon and trout rearing and migration: 18.0 degrees Celsius
North Fork John Day River
Dissolved Oxygen for Spawning: Not less than 11.0 mg/L or 95% of saturation
Temperature for Core cold water habitat: 16.0 degrees Celsius
Temperature for salmon and steelhead spawning: 13.0 degrees Celsius
Temperature for salmon and trout rearing and migration: 18.0 degrees Celsius
Big Wall Creek
Sedimentation for the formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry may not be allowed.
Temperature for salmon and trout rearing and migration: 18.0 degrees Celsius
Hay Creek
Temperature for salmon and trout rearing and migration: 18.0 degrees Celsius
Trout Creek
Sedimentation for the formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry may not be allowed.
Temperature for salmon and trout rearing and migration: 18.0 degrees Celsius
Middle Fork John Day River
Temperature for Core cold water habitat: 16.0 degrees Celsius
Temperature for salmon and trout rearing and migration: 18.0 degrees Celsius
Willow Creek
pH for pH 6.5 to 9.0
Temperature for Redband or Lahontan cutthroat trout: 20.0 degrees Celsius
Service Creek, Indian Creek, Thirtymile Creek, Flat Creek, Rock Creek, South Fork John Day River and Rudio Creek
Temperature for salmon and trout rearing and migration: 18.0 degrees Celsius
Mountain Creek, Dads Creek, Murderers Creek, Sunflower Creek, Canyon Creek, Potamus Creek, Mallory Creek, Sorefoot Creek, Deer Creek, Grass Valley Canyon, Bear Creek, Gable Creek, Little Pine Creek, Nelson Creek, Cottonwood Creek, Bridge Creek, Ditch Creek, and Battle Creek
Temperature for salmon and trout rearing: 17.8 degrees Celsius



Map 19: 303(d) Listed Streams



LEGEND

Planning Area Boundary

Oregon Department of Environmental Quality 2006 303d Listed Stream

Administered Land

Bureau of Land Management

Forest Service

John Day Fossil Beds National Monument

Other Federal

State

Private or Other

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John Day Basin Resource Management Plan Draft Environmental Impact Statement

2008

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Map 19: 303d Listed Streams

Stream shade is a function of landscape and stream geometry. Some of the factors that influence shade are listed in the Table 3-11.

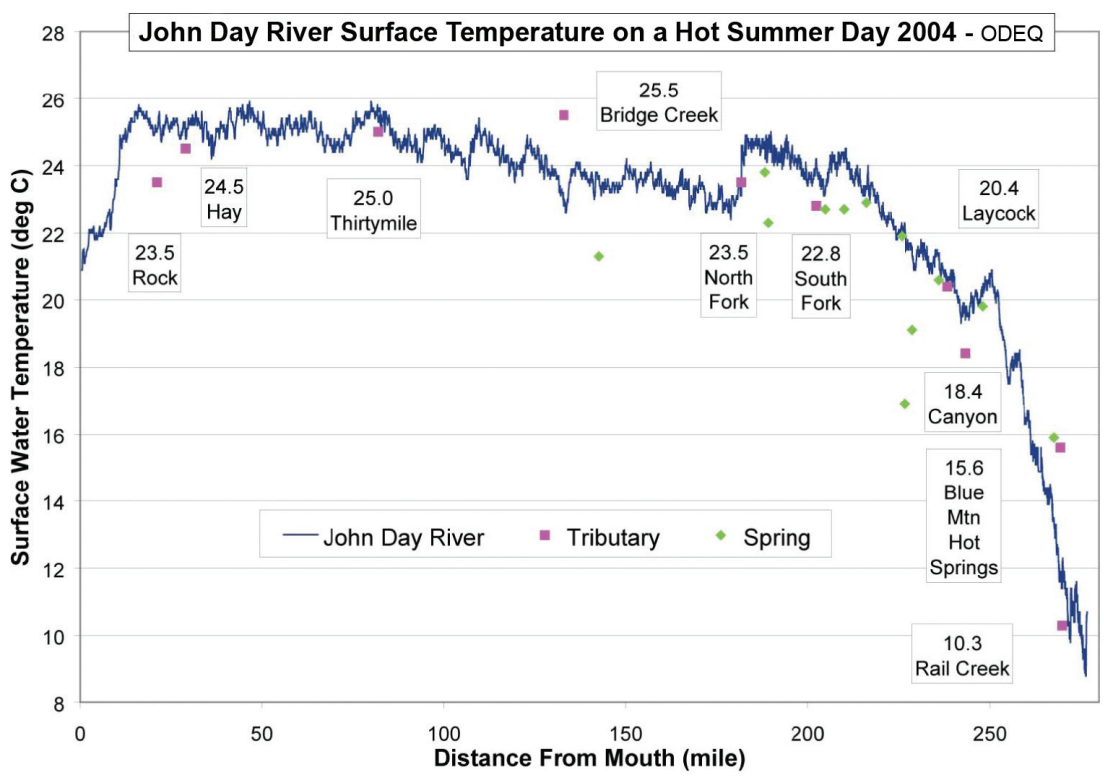
Table 3-11. Factors that Influence Stream Surface Shade

Description	Measure
Season/Time	Date/Time
Stream Characteristics	Aspect, Near-Stream Disturbance Zone Width
Geographic Position	Latitude, Longitude
Vegetative Characteristics	Buffer Height, Buffer Width, Buffer Density
Solar Position	Solar Altitude, Solar Azimuth

Figure 3-23 indicates water temperatures of the John Day River relative to the distance from the mouth of the river. The temperatures of many important tributaries are also indicated.

Preliminary analysis by the BLM of changes in river width between 1944 and 2006 indicates that the river is about 50 percent wider now than in 1944. There was also an increase in the number of islands; 44 in 1944 and 66 in 2005. The total acreage of islands also increased 42 percent.

Figure 3-23. John Day River Surface Temperature



Water Quantity

The average annual precipitation within the John Day Basin is 7.5 million acre-feet. An acre-foot is the volume of water that covers one acre to a depth of one foot. Of this total an average of about 1.5 million acre feet flows past the McDonald Ferry Gaging Station 20 miles above the mouth of the John Day River. The amount of water entering the river below this point is extremely small due to a small drainage area and low rainfall level. The remaining six million acre feet or 80% remains in the ground or evaporates or transpires into the atmosphere. For comparison, the water balance across the entire United States is approximately 30% runoff plus 70% evapo-transpiration (Leopold, 1994).

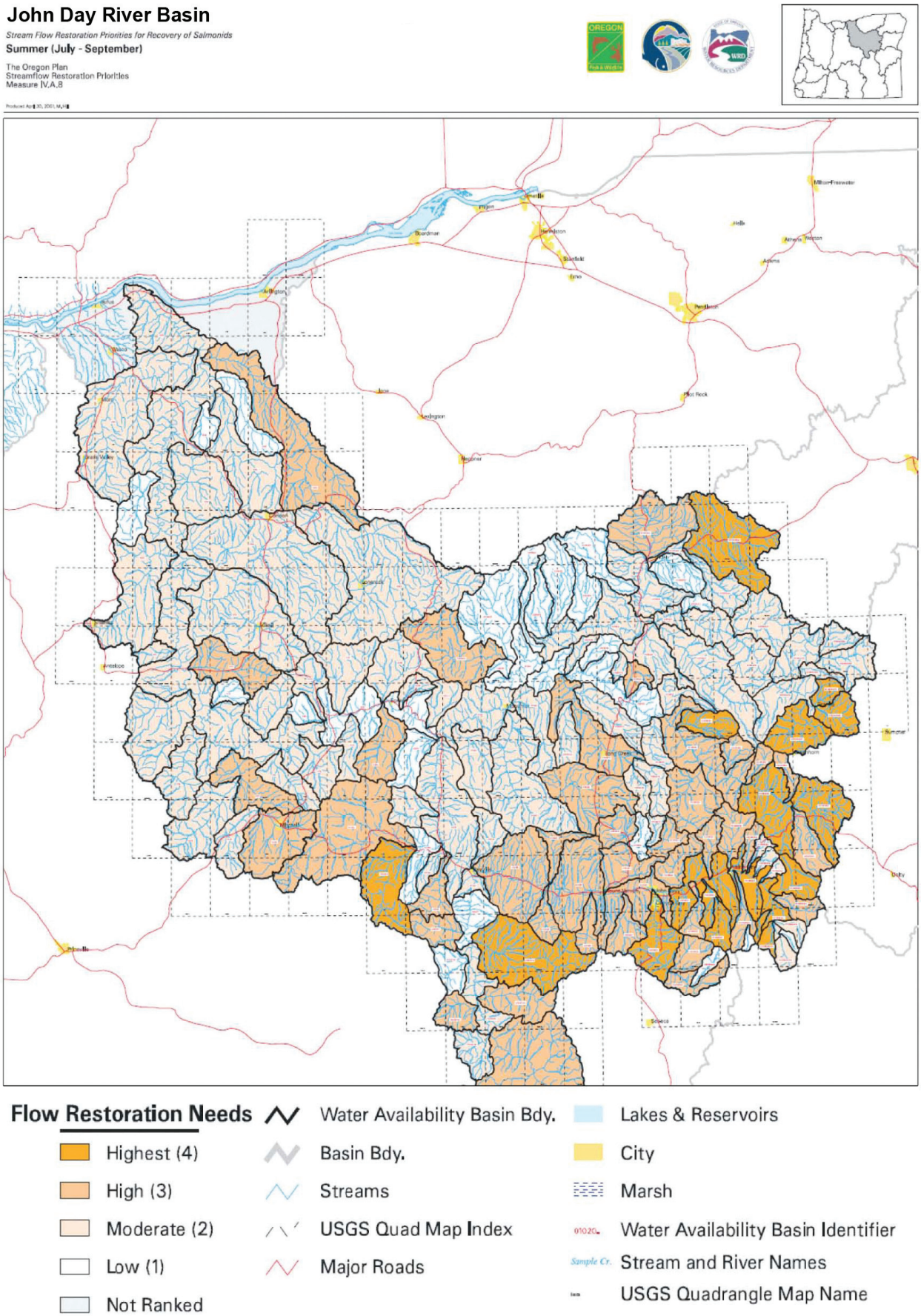
The North Fork John Day River at Monument accounts for two-thirds of the average annual stream flow near the outlet of the John Day River at McDonald Ferry. Flow is measured in cubic feet per second (cfs) or amount of flow required to pass one cubic foot of water in one second. The average annual flow at Service Creek is almost identical to the flow near the River outlet below McDonald Ferry. The contribution of the North Fork John Day River flow increases to approximately 80% during low summer flows. Similarly during low precipitation years the North Fork John Day contribution to mainstem flow is magnified compared to years with abundant precipitation. Seasons and years of low water yield are particularly crucial periods for most of the plan area's beneficial uses of water.

Regardless of the condition of BLM managed lands, the BLM's impact on water conditions in the basin is limited. This is because the 9 percent of the John Day Basin managed by the BLM (measured from McDonald Gage) intercepts only 7 percent of the total volume of basin precipitation. By contrast, the Forest Service manages 33 percent of the drainage area, but those lands intercept 43 percent of the precipitation volume of the basin.

The annual flow patterns have changed since the 19th century. Historical descriptions of the John Day Subbasin indicate that the John Day River was once a relatively stable river with good summer streamflows and water quality, and heavy riparian cover. Stream banks were covered with dense growths of aspen, poplar, and willow; cottonwood galleries were thick and wide; and beaver were very abundant (Wissmar *et al.* 1994). Now peak flows are greater and late season flows are more diminished. It is suspected that these effects are due to reduced rates of soil infiltration, reduced capacity for ground water/riparian storage, and loss of in channel storage in beaver ponds (NWPPC 2001).

Oregon Department of Fish and Wildlife and Oregon Water Resources Department have jointly recognized this trend and have identified watersheds with high flow restoration needs for salmonid recovery. These agencies identified streams and rivers with flow restoration needs in a map displayed as Figure 3-24.

Figure 3-24. John Day River Basin Stream Flow Restoration Priorities



Fisheries

The John Day River basin provides habitat for 29 documented species of native and non-native fish species. Five of the native species are "special status species" including: Middle Columbia distinct population segment (DPS) summer steelhead DPS listed under the Endangered Species Act (1973) as Threatened (12/23/05), bull trout as Threatened (6/10/98), interior redband trout DPS (12/23/05) as sensitive, westslope cutthroat trout as sensitive and Pacific lamprey as sensitive. Chinook salmon is an important native game species that spawns in the John Day basin.

Information on trends and distribution has focused primarily on anadromous (sea run) salmonids, and to a lesser extent on resident salmonids and warm water game species. Native and introduced non-game species populations and distribution have generally not been assessed. Introduced game species typically have been analyzed to determine if the introduction was successful and if so what fishery could be sustained.

Pacific Lamprey and Fall Run Chinook Salmon

Pacific lamprey and a small run of fall Chinook salmon in the lower John Day River are species of interest in the John Day system. Although these runs have been less extensively monitored than other runs, restoration efforts designed to protect and restore habitat for spring Chinook salmon and summer steelhead will benefit these anadromous species and native resident species in the John Day River System.

Spring Chinook and Summer Steelhead

The John Day River system supports one of the few remaining wild runs of Spring Chinook salmon (Lindsey *et al.* 1986, OWRD 1986, Quigley and Arbelbide 1997) and summer steelhead (Quigley and Arbelbide 1997, OWRD 1986) in the Columbia Basin, providing approximately 117 miles of spawning habitat for spring Chinook and 1,800 miles for summer steelhead (ODFW 1997).

Salmonid habitat is similar for the various species. Summer steelhead spawn in cool, clear streams with suitable gravel (pea size to golf ball size), depth and current velocity. Steelhead enter streams and arrive at spawning grounds weeks or even months before they spawn and are vulnerable to disturbance and predation during this time. Summer steelhead begin to spawn as the temperature of the water warms and approaches optimal levels in spring to early summer depending on elevations. Eggs hatch in 30 to 60 days depending on water temperature. Fry emerge from the gravel and within a few days absorb the yolk sack and become free swimming. Rearing habitat is cool, clean water with an optimum temperature of 55 degrees Fahrenheit. Channel structure includes pools and riffle/glides with adequate depth and overhead cover (vegetation, banks and/or woody debris). Vegetation near the channel is desirable to reduce solar radiation and also provided a food base for aquatic and terrestrial insects that, in turn, serve as a food for fish. Juvenile steelhead remain in these waters through the summer, fall, and winter and depending on conditions may begin their migration to the sea in the late spring one to three years after hatching. Within the plan area, 2,313 miles of stream are used by steelhead for spawning and rearing. Of those streams, 155 miles are in BLM managed streams (BPA, 2006). In some instances steelhead may become residents and never migrate to the sea.

Chinook salmon spawning habitat is similar to that used by steelhead although ideal gravels are golf-ball to baseball sized. Spring Chinook spawn in the fall and eggs overwinter in the gravel with emergence occurring in the spring. Rearing occurs in the natal streams or adjacent cool water tributaries. Rearing habitats are the same as for steelhead. Juvenile out migration usually, but not always, occurs the following winter/spring on high flows. Within the John Day Basin, spring chinook use 154 miles of stream for spawning and rearing, 467 miles of rearing and migration, and 10 miles for only migration. Of those streams, 136 miles are in BLM managed streams (BPA, 2006).

The productivity of these populations is determined by the number of returning adults. Index reaches have been established by ODFW throughout the basin. These index reaches are monitored each year to determine the number of redds (spawning nests) and then extrapolated to an estimate of the number of returning adults. Table 3-12 displays the annual production goals for spring Chinook salmon and summer steelhead.

Table 3-12. Average Annual Goals for Spring Chinook Salmon and Summer Steelhead

Species	Sport and Tribal Harvest Estimates	Natural Reproduction Escapement Estimates	Total Escapement Goal	Average Escapement 1989-1998
Spring Chinook Salmon	1,050	5,950	7,000	2,310
Summer Steelhead	11,250	33,750	45,000	8,370

Source: ODFW (1990)

Populations of desired fish species are the product of habitat features needed for the life stages from egg to maturity. Within the John Day basin, stream/river habitats offer suitable gravel for spawning, adequate high quality water for rearing and good flows for migrations. Out of basin influences such as hydroelectric dams, ocean conditions, harvest and predation play a vital role in the number of Chinook salmon and steelhead returning to the John Day basin.

Key Habitat quantity is a limiting factor for approximately 95 percent of the geographic areas for both Chinook salmon and summer steelhead. Key habitat quality refers to the key habitat type required of each life stage for each species. The John Day Basin Plan from the Northwest Power and Conservation Council identified channelization of streams and rivers, habitat diversity, water temperature, sediment load, and flow as limiting factors for steelhead and Chinook in their key habitats (John Day Basin Revised Draft Plan 2005)

The lower 200 miles of the John Day River function primarily as a migration corridor for anadromous salmonids. Tributary streams in this portion of the basin accounts for an estimated 6 percent of the steelhead production in the John Day basin. A small run of fall Chinook salmon utilize the lower segment up towards Cottonwood Bridge for spawning (OWRD 1986). The upper mainstem John Day River and/or tributaries produce an estimated 18 percent of the spring Chinook salmon and 16 percent of the summer steelhead in the John Day basin (OWRD 1986). Increasing population trends since 1959 for spring Chinook salmon are indicated in the upper mainstem John Day sub-basin. These trends are attributed to management and restoration efforts implemented over the last few decades (ODFW 1997). The South Fork sub-basin produces approximately 7 percent of the summer steelhead population in the John Day basin (OWRD 1986). The North Fork and Middle Fork John Day sub-basins produce approximately 82 percent of the spring Chinook salmon and 73 percent of the summer steelhead population in the John Day basin (OWRD 1986). There has been no sport fishing of spring Chinook salmon since 1977, and the steelhead fishery has been limited to the catch and release of “wild” (non-adipose fin clipped) fish from 1996 to the present. Steelhead production takes place in the tributaries and headwaters of the river, mostly outside the river corridor (John Day River Proposed Management Plan 2002).

Resident Salmonids

Several species of resident salmonids inhabit the John Day River system. Interior Redband trout (Behnke 1992) occur throughout the basin primarily occupying river habitats in the upper subbasins and tributary habitats. Hatchery supplementation with rainbow trout occurred prior to 1986 but with the “wild fish policy” ODFW no longer releases hatchery fish in streams associated with the John Day River. One native subspecies of cutthroat trout, Westslope, is found in tributary streams of the upper mainstem John Day River. Westslope cutthroat were introduced in 1960 from Deardorff Creek to Clear Creek and South Fork Desolation Creek in the North Fork John Day subbasin. Yellowstone cutthroat and Lahonton cutthroat were stocked in certain North Fork John Day reservoirs in the past.

Resident trout and Westslope cutthroat, like steelhead, spawn in the spring. Gravel size is smaller and depends on the size of the spawners. Resident trout can mature and spawn at 7-8 inches in length and continue spawning with increased growth. Incubation period is temperature dependent. Rearing habitats are similar to steelhead but typically upstream of these areas.

Rainbow trout were planted in various streams and ponds in the John Day Subbasin beginning in 1925 and periodically continued through 1997. Some streams only received one planting while other streams received 147. The streams where rainbow trout were consistently stocked include Canyon Creek and the John Day River in the upper mainstem watershed; and Camas Creek, Desolation Creek and North Fork John Day River in the

North Fork watershed (Northwest Power and Conservation Council, 2005). ODFW's "wild fish" policy suspended stocking in all streams, however, some ponds/reservoirs with a stream outlet were stocked until 2001. These plantings were designed for a "put and take" sport fishery and ODFW determined the risk was low that survivors from these plantings would interbreed with native populations (Morris, 2006).

Westslope cutthroat trout probably never were widely distributed in the Blue Mountains or Columbia Plateau. Productivity has been adequate to sustain localized migratory and isolated populations, resulting in current populations thought to be fairly secure. However, this conclusion must be tempered by uncertainty regarding the genetic integrity of remaining populations. Most current wild populations are depressed. Hybridization, fragmentation and loss of migratory populations have limited healthy populations to a much smaller proportion of their historical range. Further, competition with introduced rainbow and brook trout has impacted the ability of the species to fully occupy its natural niche in the ecosystem (John Day Basin Revised Draft Plan 2005).

Bull trout were listed as threatened on June 10, 1998 (63 FR 31647). The John Day basin is included in the Columbia River DPS. Within the basin, eleven existing local populations (or stocks) were identified. Three subbasins, North Fork John Day, Middle Fork John Day and mainstem John Day each contain a Core Area, meaning the fish from the area spawn in a particular stream, at a particular season, and which to a substantial degree do not interbreed with any group spawning at a different place, or in the same place at a different season. All spawning occurs in cooler headwater segments of the three subbasins. The various down river segments including BLM land are utilized as winter rearing/foraging habitat. Presently, bull trout occur in 45 percent of their historical range (Quigley and Arbelbide 1997) The North Fork and mainstem John Day populations are considered to be at moderate risk of extinction and the Middle Fork John Day are at high risk of extinction (Ratliff and Howell 1992).

Bull trout reach maturity at sizes similar to resident trout but are fall spawners. Substrate is normally smaller, clean gravels in headwater reaches. Bull trout prefer sites with upwelling rather than the typical pool tail area of other salmonids. Preferred temperatures in these headwater streams are cooler with the optimum about 45 degrees F. Rearing habitats are similar but productivity is greater in habitats with an abundance of woody debris.

Although Bull Trout historically occurred throughout the John Day Subbasin, they were probably never as abundant as other salmonids in the subbasin. It is certain that they were more abundant and more widely distributed then they are today. The current distribution of bull trout is clearly fragmented (Ratliff and Howell, 1992). In the winter of 2004, ODFW documented subadult bull trout movement in the mainstem John Day River down to the National Park Service Interpretive Center (RM 203) and in the Middle Fork to the hot springs at Ritter (RM 15). Recent survey work by Oregon Department of Fish and Wildlife (Hemmingsen *et al.*, 2001) detected bull trout in the mainstem John Day River at river mile 170 near the town of Spray, downstream of the confluence with the North Fork John Day. Two bull trout were radio tagged and tracked upstream during the summer (John Day Basin Revised Draft Plan 2005). Both fish entered the North Fork, one traveling 112 mile over a period of 77 days, the other 137 miles into the tributary of Granite Creek to mile 3.8. The presence of bull trout at Spray confirms there is a component of movement along the rivers to the local population in both the North Fork and mainstem John Day Rivers. These fish utilize the lower river segments as winter foraging habitat which include segments flowing through public lands.

Introduced Smallmouth Bass and Channel Catfish

The John Day River also supports an increasingly popular warm water sport fishery. A review of habitat requirements revealed the river exhibits good conditions for both smallmouth bass and channel catfish. Upon assurance that warm water species predation on salmonids would be minimal, these species were introduced into the John Day River below Kimberly (RM 185) in the early 1970s (ODFW 1999). Smallmouth bass are distributed throughout the mainstem from the mouth to Picture Gorge (RM 205), the North Fork from the mouth to Desolation Creek (RM 60), and the Middle Fork from the mouth to Big Creek (RM 39). This species appears to be increasing upstream distribution by adapting to marginal habitat conditions higher in the basin. Diet studies support the theory that smallmouth bass in the John Day are a minimal risk to migrating salmonids. Smallmouth bass have successfully filled a niche in the John Day River, which has developed into a nationally recognized sport fishery.

Wildlife

The John Day Basin contains a rich wildlife population. Wildlife within the basin utilize habitats that range from dense moist forest to dry shrub and grasslands. There are 378 terrestrial species that utilize the Blue Mountains. Fifty-one of these species migrate through or are occasional visitors in the Blue Mountains (Thomas, 1979). There is one federally listed species with incidental and dispersal habitat, two formerly listed species, and 31 Bureau Sensitive Species (Appendix H). Mule deer, elk, antelope, bighorn sheep, and chuckar are considered locally important species. Additionally there are numerous neotropical migratory bird and upland game birds.

The John Day main-stem, North, and South Forks provide bald eagle winter roosting habitat, potential peregrine falcon eyrie habitat, California big horn sheep habitat, and neotropical migratory bird habitats. Of the 378 terrestrial species known to occur in the Blue Mountains, 285 (over 75%) are either directly dependent on riparian zones, or use them more than other habitats. Consequently, these riparian areas are the most critical wildlife habitats in the Blue Mountains (Thomas, 1979).

Neotropical migratory birds breed and raise young in the planning area in the spring and summer then migrate south to areas in Mexico and South America during the fall and winter. These birds range from small sparrows and warblers to large woodpeckers and raptors. All habitat types are utilized with riparian areas having the highest proportion of use.

Large ungulates, such as mule deer, elk and antelope, are common year-round residents in the John Day Basin. Critical big game winter ranges occur in the North and South Fork of the John Day Rivers (See Map 20: Key Big Game Habitats). Many of the foothills along the John Day River are used as winter range by these species. The ODFW sets population and species management goals within the state. The BLM cooperates with ODFW in helping to meet these goals by providing an appropriate amount and quality of habitat on public land consistent with multiple-use management.

In 2005 ODFW published "The Oregon Conservation Strategy." The BLM and other management agencies have agreed to manage consistent with direction contained in this document. The Oregon Conservation Strategy identifies habitat values, Conservation Opportunity Areas (COAs), and suggests management considerations. See Map 6 in Chapter 2 for the location of COAs.

North Fork John Day Acquisition Lands

The wildlife habitat acquired in the John Day Basin contains representative coniferous forest, riparian, montane shrub, grassland, and western juniper habitat. The acquisition lands contain approximately 75 miles of riparian habitat.

The North Fork acquisition lands contain some of the most diverse riparian and coniferous forest communities on BLM land in the basin. The north slopes provide refugia for many wildlife species due to wetter communities that stay green longer during the hot summer months. The drainages, north slopes, and higher elevations on the north side of the river contain coniferous forest communities. Some of these forest communities are in relatively large blocks and stringers, providing contiguous habitat that benefit wildlife species utilizing interiors of these habitats.

The southern aspects and ridge tops on the north side of the river are dryer habitat types that receive more solar radiation in the winter and thus provide important mule deer and elk winter range; providing habitat for 1,200 - 1,500 elk and 3,000 - 4,000 mule deer.

The North Fork provides important wintering habitat for the bald eagle, a large nesting population of Lewis' woodpeckers, and lies within historic California Bighorn Sheep habitat.

Key Habitat Components

Fragmentation

Fragmentation occurs when human or natural activity creates breaks in what was formerly more or less a contiguous habitat type. Palouse prairie habitats are some of the most fragmented habitats within the planning area due to agricultural conversion. This occurs primarily on private lands. Shrub steppe habitats are becoming more fragmented due to the expansion of juniper into these habitats. Forested habitats on BLM lands have lower levels of fragmentation than surrounding private lands. Roads and fire may also create breaks in habitat. For the most part, however, many roads on BLM lands are two-tracks that minimally contribute to fragmentation.

Connectivity

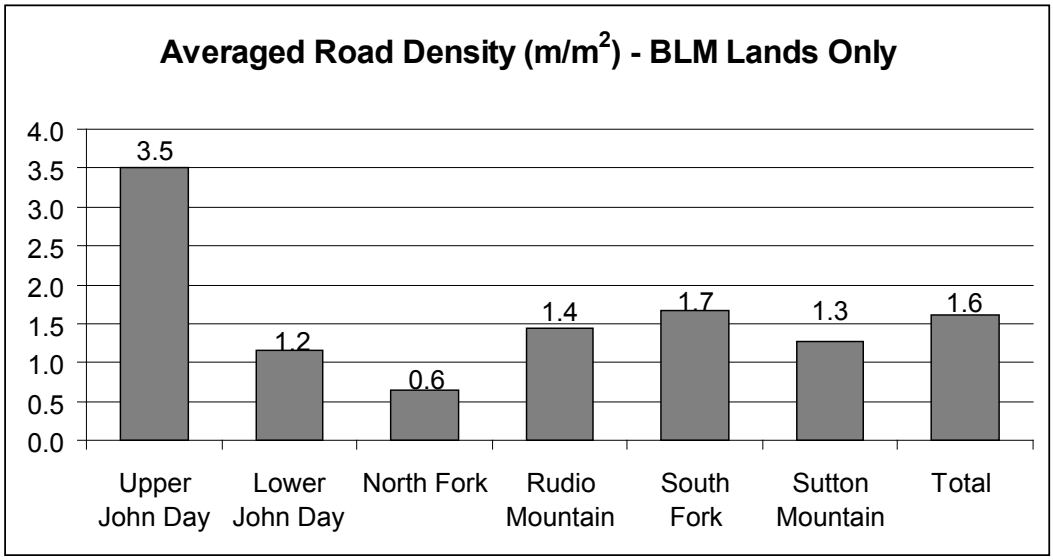
Connectivity at the landscape scale has not been analyzed. There are known local migration areas for big game moving to wintering grounds. It is also believed that portions of the planning area provide connectivity for species dispersal between the Blue Mountains, Ochoco Mountains, and the Cascade Range. Outside of fragmentation issues there are no known barriers within the planning area that would preclude habitats from being used as connectivity habitat

Road Density

Road density is a key element in determining the amount of habitat fragmentation within a given area. Road density analysis was completed previously utilizing a roving windows approach. This method assigns road density groupings to areas of land.

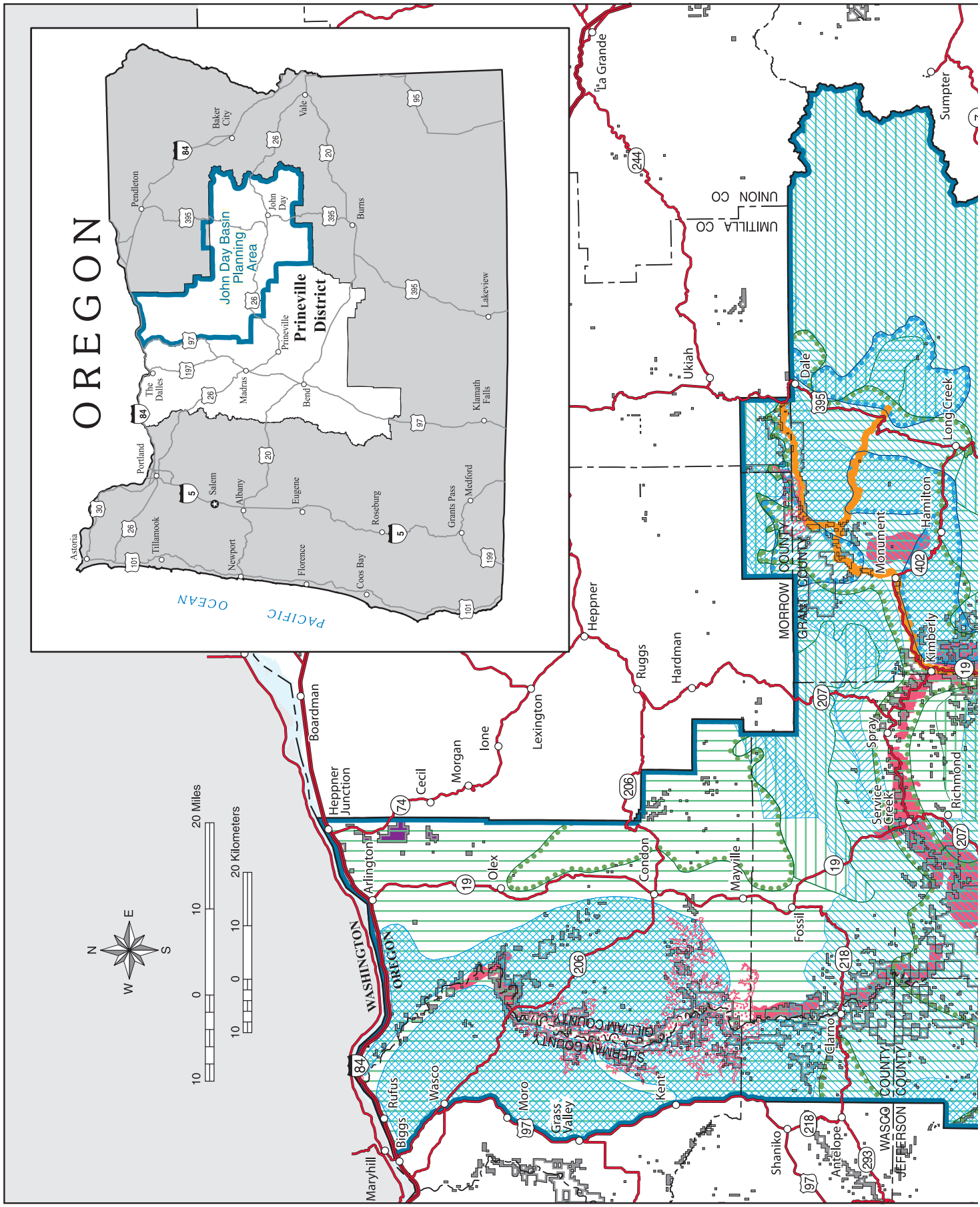
Figure 3-25 displays the average road density on BLM lands within the planning area. In general most lands are within the 0-2 or 2-4 miles per square mile range (mi/mi^2) range. This analysis was based on roads inventoried at the time.

Figure 3-25. Road Density on BLM lands within the Planning Area

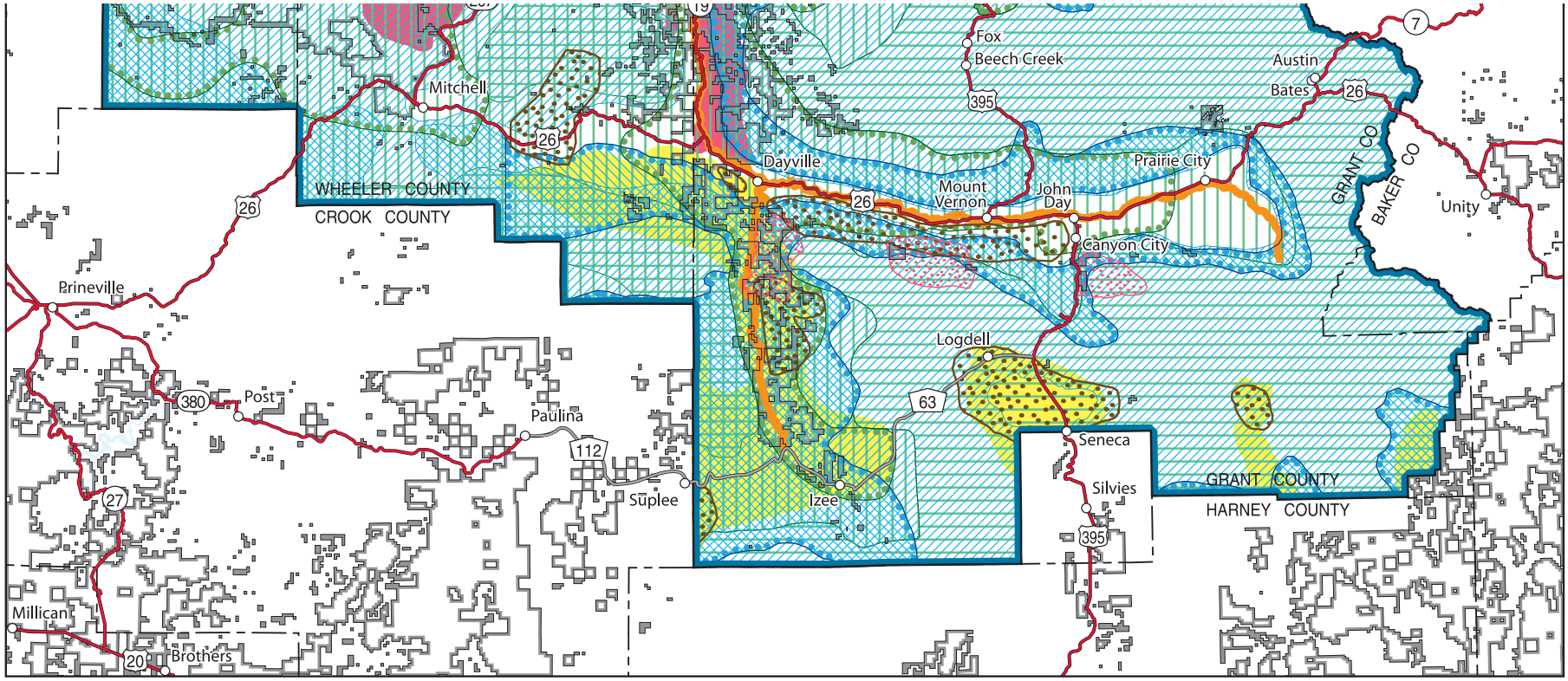


Special Status Wildlife Species

The John Day basin has a variety of special status species that are either known or thought to occur within its boundaries. For a list of Sensitive species that are known to occur or may occur within the John Day basin, see Appendix H.



Map 20: Wildlife Habitats



LEGEND

Elk Range
- Critical Winter Range
- Winter Range
- Summer Range

Mule Deer Range
- Critical Winter Range
- Year-round Range
- Summer Range

Big Horn Sheep Habitat
- Current
- Potential

- Antelope Year-round Range
- Washinton Ground Squirrel Habitat
- Raptor Roosting and Foraging Area
- Greater Sage Grouse Habitat
- Planning Area Boundary
- Bureau of Land Management Administered Land

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

PRINEVILLE DISTRICT

John Day Basin
Resource Management Plan
Draft Environmental Impact Statement

2008

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Map 20: Wildlife Habitats

The Canadian lynx is currently listed as Threatened across the contiguous United States by the USFWS, pursuant to the Endangered Species Act of 1973, as amended (50 CFR Part 17, Federal Register/Vol. 63, No. 130/July 8, 1998/36993-37013). The analysis area is outside of designated lynx denning, foraging, or travel habitat. Self-maintaining lynx populations in Oregon have not existed historically, and lynx occurrence here is likely the result of dispersal from occupied areas with declining prey populations (Verts and Carraway 1998). The planning area may be important in providing connectivity between Idaho and the Cascade Mountains Geographic Area, although the Snake River and Hells Canyon likely would impede lynx movements.

It is highly questionable if California wolverine and fisher utilize the BLM lands within the planning area at all. The fisher is very rare in Oregon with most sightings occurring in the Coast and Cascade mountains and wolverine were always rare in Oregon. (Csuti, 1997). If use did occur it would likely be as incidental foraging or dispersal. The BLM lands within the planning area have very limited moist forest habitat that is relatively roadless and elevation ranges on BLM lands don't support snow pack longevity sufficient to provide reproductive sites for wolverine. Reproductive habitat elements are not as limited for fisher as they are for wolverine; however, suitability on BLM lands is marginal. Scattered ownership and past forest practices limit the amount of continuous closed canopy stands.

The northern bald eagle was formally de-listed on July 28th of 2007. Protection under the Migratory Bird Treaty Act and the Bald Eagle Protection Act will continue. The action was proposed because the available data indicated that the bald eagle has met and exceeded recovery goals. A detailed account of habitat requirements can be found in the Pacific Bald Eagle Recovery Plan (USDI Fish and Wildlife Service, 1986). Generally speaking, bald eagle nesting territories are associated with lakes, reservoirs, or rivers. Nests are usually found in large conifers in uneven-aged, multi-storied stands and several nests are common in a nesting territory. In Oregon east of the Cascade Range eagles prefer nesting in ponderosa pine trees that average 46 inches in diameter (range 21-76 inches) and tend to be larger than surrounding trees (Anthony *et al.*, 1982). Roost stands generally average 20 inches dbh (range 13-40 inches) with a height of 91 feet (range 50-125 inches).

This species is a winter inhabitant of the John Day basin, utilizing the John Day River corridor as a primary use area from November to March. Numerous roost areas, as well as a few known nest sites occur in the basin. There are no documented nests on BLM lands. Small tracts of BLM lands in the Rock Creek area are within a designated Bald Eagle Management Area (BEMA). The primary roosts are large cottonwood and conifer trees located throughout the river corridor. Most foraging occurs from Service Creek to the Blue Mountain Hot Springs on the mainstem John Day River, with the North Fork John Day also receiving significant use. Carrion, fish, ground squirrels, and waterfowl are primary food sources of the bald eagle.

Peregrine falcon was formally de-listed in 1999; however, the peregrine will continue to be protected by the Migratory Bird Treaty Act. Peregrine falcons inhabit cliffs approximately 0.25 – 1 miles from some form of riparian habitat. In 2001 the Prineville District contracted a habitat analysis survey. The survey found no active sites but did identify 37 potential sites within the planning area. These sites had the following ratings for potential: 9 High, 3 High Historic, 17 Medium, and 8 Low (Pagel, 2001).

Columbia Spotted Frog is currently considered a Bureau Sensitive species. This species is found in the South Fork of the John Day and is suspected to occur in the North Fork and its tributaries. The typical habitat is large wet meadows that remain damp during the summer months. No formal surveys have been conducted for this species; therefore the extent of the population range and size is unknown.

Yellow-billed cuckoo is currently considered a Sensitive species by the BLM. This species occupies dense closed-canopy riparian areas with various species of willows (Csuti *et al.*, 1997). Patches must be > 37 acres in size with >7 acres of closed canopy. This species feeds primarily among cottonwoods. Although there are numerous cottonwood stands within the planning area, few approach the necessary patch size. Only one historic sighting in 1989 near Mt. Vernon exists in any district data base. No surveys have been conducted for this species; therefore the extent of the population range and size is unknown.

Washington ground squirrel is currently considered a Sensitive species by the BLM. Palouse Prairie habitats around Horn Butte provide some of the only habitat for Washington ground squirrel in Oregon. Washington ground squirrels inhabit grasslands and shrub steppe habitat dominated by big sagebrush, bluebunch wheatgrass , needle-and-thread grass, Idaho fescue, and Indian ricegrass. These grassland and shrub steppe habitats are

considered some of the rarest ecosystems in the Oregon portion of the Columbia Plateau. Washington ground squirrels play a number of important roles in these ecosystems, as a prey species for raptors and other predators, by influencing plant community composition and structure through selective feeding, and in the creation and use of burrow habitats used by other species. Washington ground squirrels are a prey item for two state sensitive species, the ferruginous hawk and Swainson's hawk.

In 2002 the ODFW completed a study of habitats and populations in the Horn Butte area. A total of seven Washington ground squirrel sites were confirmed – and all seven were located on the Fourmile Tract. Vegetation at detection sites was variable and most sites had a composite of grass and shrub communities present. 89% of the larger Horn Butte tract is comprised of Sagehill and to a lesser degree Warden soil, and since historical sightings were on this tract, it is significant that squirrels were not located here during this study (Morgan, 2002). In 2000 a wildfire burned a large portion of this area and thus much of the vegetation mapped was dominated by annual vegetation (Morgan, 2002). Observations indicated that squirrel abundance and activity was relatively low. However, this was a one year study with populations not being monitored during seasons of higher squirrel activity. Due to the duration of the study, the impacts of yearly precipitation on population numbers and distribution are not ascertainable.

The John Day Sub-basin draft plan (BPA, 2005) states that a number of terrestrial wildlife species have been extirpated from the John Day Subbasin, including the Columbian sharp-tailed grouse, the gray wolf, the grizzly bear and the California bighorn sheep. Columbian sharp-tailed grouse were extirpated from Oregon in the 1960s due to a combination of factors, including over-hunting in the mid- to late- 19th century, the conversion of native habitats to crop production and habitat degradation from livestock grazing (Hays *et al.*, 1998, Crawford and Coggins, 2000). Sage grouse, a species dependent on shrub steppe habitat, were extirpated from the John Day Subbasin by 1955 because of habitat conversion, overgrazing and over-hunting (Stinson *et al.*, 2003). The gray wolf and grizzly bear were both extirpated from the subbasin by the 1940s, primarily due to predator control efforts. California bighorn sheep were extirpated from Oregon by 1915 due to over-hunting, unregulated domestic livestock grazing, and parasites and diseases carried by domestic livestock. However, these sheep have been successfully reintroduced in many areas of the John Day Subbasin (ODFW, 2003).

"Historically, California bighorns were the most abundant wild, native sheep in Oregon (Toweill and Geist, 1999). They were found throughout the steeper terrain of southeast Oregon, and the non-timbered portions of the Deschutes and John Day River drainages, with the timbered regions of the Blue and Umatilla Mountains separating them from Rocky Mountain bighorn sheep. Similar to Rocky Mountain bighorn sheep, California bighorns were an important source of food and clothing for Native Americans, and were utilized heavily for food and trophies during the homesteading and early settlement periods of Oregon. Thousands of domestic sheep also were trailed across eastern Oregon, including most California bighorn habitats. This likely resulted in contact with bighorns which may have led to mortality as a result of livestock related diseases and parasites.

Attempts to protect California bighorn began as early as 1899 with regulated hunting, and in 1911 with full protection of bighorn sheep (Anonymous, 1911). The Steens Mountain Game Refuge was established in southeast Oregon around 1915 because the last California bighorns remaining by this time were reported there (ODFW, 2003). Unfortunately this attempt failed and California bighorns were extirpated from Oregon by 1915. Indiscriminate hunting, unregulated grazing by domestic livestock, and parasites and diseases carried by domestic livestock all contributed to the eventual demise of Oregon's native bighorns."

Efforts to restore California bighorn sheep to Oregon began in 1954 and eventually moved to the John Day basin. Current population estimates and a list of release sites are described in Table 3-13.

Table 3-13. Bighorn Sheep Releases and Current Population Estimates in the John Day Basin

Year	Location of Release	Number of Animals	Current Population Estimate
Lower John Day River			**600-650**
1989	Thirtymile Canyon	14	
1990	Horseshoe Bend	15	
1995	Jackknife Canyon	21	
1999	Little Ferry Canyon	15	
2004	Red Wall	19	
Mainstem and South Fork John Day River			
1971	Canyon Mtn	21	Non-viable
1978	Aldrich	14	100
1981	Aldrich	4	
1988	McClellan	15	120
1992	McClellan	7	
North Fork John Day River			
2003	Potamus	21	49-52

In Oregon, most California bighorn herds are non-migratory. Herd ranges generally provide contiguous summer and winter range and sheep are therefore year long residents not moving through areas of non-habitat. Thus dispersal and establishment of new populations in new habitats is limited. In general, California bighorn sheep prefer rugged, open habitats with high visibility of their surroundings. Survival is positively correlated with amount of cliffrock, rimrock, and rocky outcroppings. Rocky outcrops are particularly important for lambing and escape from predators.

ODFW works with federal land managers prior to any release to ensure habitat needs are met and any conflicts with domestic sheep are analyzed and adequately addressed. Transplant sites on private land must receive landowner approval prior to release of bighorn sheep. Cooperative agreements to ensure habitat integrity of release sites and reasonable public hunting access must be in place prior to release.

Substantial amounts of historic habitat are not currently suitable for California bighorns because of long-term habitat change. For example, urbanization occupies some historic ranges and others have been converted to other uses making these sites unsuitable for bighorn sheep. Fire suppression activities throughout the last 100 years have allowed woody plants and conifers to encroach upon once open habitat, decreasing their suitability for bighorns. Because bighorns rely on their vision as a way to avoid predators, dense stands of junipers or other conifers can reduce visibility and increase predator effectiveness. Further, junipers may compete for water and nutrients needed by forage plants on desert ranges and therefore can decrease forage quantity and quality as well as live water availability from springs and seeps. Some junipers can be beneficial by providing shade and escape cover in certain instances. However impacts of large dense stands are generally negative.

Some historic California bighorn sheep habitat along the John Day River is not currently inhabited. Concerns about domestic sheep, mainly mouflon, spreading disease to native herds of bighorns continues to be a factor. Where these concerns can be mitigated, and where habitat is suitable, the opportunity to reintroduce California bighorn sheep into native habitats remains an option. The ODFW Bighorn Sheep Management Plan (2003) has identified several areas in the basin where California bighorn sheep populations could be reintroduced or supplemented. The Prineville BLM in conjunction with ODF&W will be mapping existing and historic habitats; as well as identifying specific habitats for restoration.

The greater sage-grouse is currently considered a Sensitive species by the BLM, and therefore a Special Status species. Greater sage-grouse is also considered to be a vulnerable species by the State of Oregon. The United

States Fish and Wildlife Service is currently reexamining whether to list the greater sage-grouse under the Endangered Species Act (ESA). The John Day Sub-basin draft plan (BPA, 2005) states that greater sage-grouse, a species dependent on shrub steppe habitat, were extirpated from the John Day Sub-basin by 1955 because of habitat conversion, overgrazing and over-hunting (Stinson *et al.*, 2003). However, there have been reports of more recent sightings and there is potential for occupied habitat in the sagebrush uplands along the South Fork John Day River and areas around Dayville. In 2005 the BLM contracted ODFW to survey the South Fork John Day lands in an attempt to better determine greater sage-grouse use and abundance in this area. No additional sightings were recorded. Additional surveys will be required to acquire better population and distribution data.

Greater sage-grouse historically inhabited much of the sagebrush-dominated ecosystems of North America. Today, the greater sage-grouse population abundance and extent have declined throughout most of their historical range. Population dynamics of greater sage-grouse are marked by strong cyclic behavior; however, in the last 30 years, the peak in the cycle of bird numbers has declined. ODFW allows a permit based harvest of 5% or less of greater sage grouse populations.

Habitat requirements for greater sage-grouse vary greatly depending on the season and life-history stage. Key habitat components include adequate canopy cover of tall grasses and medium height shrubs for nesting, abundant forbs and insects for brood rearing, and availability of herbaceous riparian species for late growing season foraging.

Resource Trends

In general, both the quantity and quality of natural wildlife habitat in the John Day basin have declined since Euro-American settlement. Among the many causes for this decline was historic logging and grazing practices, wildfire suppression, drought, agricultural conversion, weed invasion, human expansion into rural areas, and recreational activities. Habitats are constantly changing with new disturbances, both natural and unnatural. Some species have increased with these disturbances; others have declined.

Regional Context

Habitat conditions and trends within the John Day Basin are consistent with the finding of The Interior Columbia Basin Ecosystem Management Plan (ICBEMP). That plan took a broad view of wildlife habitats across the entire Columbia Basin through the late 1990s and early 2000s. In 2005 the Bonneville Power Administration (BPA) did a tiered analysis at a finer scale focusing on the John Day Basin.

The BPA report made several observations: Reduction of cover and vigor of big sagebrush, antelope bitterbrush, and other shrubs, grasses, and forbs by juniper can have negative impacts on a multitude of wildlife species, including critical big game winter range. Western juniper can be an important element in the habitat for many wildlife species, but at densities that allow a healthy understory of shrubs and grasses (Miller, 2001). Once juniper becomes dominant on sites understory species cover and vigor declines. Increasing juniper dominance at both the community and landscape levels will result in a general decline in plant and community diversity, resulting in a decline of wildlife abundance and diversity (Miller *et al.*, 2005). Reduction of cover and vigor of big sagebrush, antelope bitterbrush, and other shrubs, grasses, and forbs by juniper can have negative impacts on a multitude of wildlife species, including ground nesting migratory birds and critical big game winter range.

Unique or Key Features

- 1 Winter Range - Critical big game winter ranges exist on the North and South Forks of the John Day River.
- 1 Caves –Wildhorse Point Cave has confirmed use by western big-eared-bats. There are several smaller openings in rock structures along the Main stem, North Fork, and South Fork of the John Day River that have not been surveyed with roosting potential.
- 1 Cliffs – Steep cliffs along the North and South Forks and the Main-stem of the John Day provide potential habitat for nesting golden eagles, prairie falcons, and peregrine falcons.

- 1 The Horn Butte ACEC was designated for its long-billed curlew nesting habitat; a management plan was prepared in 1989 proposing land acquisition, livestock management, noxious weed control and closure of the area to off-road motorized use. Since 1989 approximately 80% of the ACEC has been burned by wildfire.
- 1 Palouse Prairie habitats around Horn Butte provide some of the only habitat for Washington ground squirrel in Oregon.
- 1 Lewis' Woodpecker habitat on the North Fork of the John Day.
- 1 Wintering bald eagle habitats on the North Fork of the John Day.

Amphibians and Mollusks

There are two special status species of amphibians known to be in the Prineville District. The Oregon spotted frog (*Rana pretiosa*) and the Columbia spotted frog (*Rana lutieventris*). Another species Cope's giant salamander (*Dicamptodon copei*) is possibly on the district on the White River, but this has not been confirmed. Only the Columbia spotted frog is within the planning area. It occupies streams and ponds in the upper John Day basin with shallow still water and low vegetation.

There are six species of special status mollusks known to be in the Prineville District. Three of these are aquatic snails, the barren juga (*Juga hemphilli hemphilli*), the purple-lipped juga (*Juga hemphilli maupinensis*), and the Dalles juga (*Juga hemphilli dallesensis*). All of these snails are found outside of the planning area in the Deschutes River basin or the Columbia River Gorge west of the Dalles.

Three of the mollusk species are terrestrial. Two of these, the Deschutes mountain snail (*Oreohelix variabilis* ssp. *nov.*) and the Deschutes sideband are restricted to the Deschutes River Basin and are not found in the Columbia Gorge. The third species, the Dalles mountain snail (*Oreohelix variabilis*) is found in and within 10 miles of the Columbia Gorge in the central and eastern part. This snail lives in talus piles on northern aspects on the Oregon side of the Columbia gorge. The talus is often associated with springs although it usually occupies only the margins of those springs. One of the historic sites for this species is in the vicinity of Biggs Junction. Although recent attempts to collect this species at the site failed (Frest and Johannes, 1995), there is a possibility that populations still exist along the gorge and along the lower John Day River.

In 1995 Deixis Consultants summarized what was known about freshwater and terrestrial snails in the interior Columbia Basin (Frest and Johannes, 1995). This document listed approximately 200 snails that might be sensitive many of these have not been fully described or named to species. Most major sub-basins were found to have at least a few sensitive species and some had many. The John Day basin however had no listed species. Frest and Johannes state that in the Oregon interior basins "there is no indication of land snail endemism in this region, although this is likely partially due to lack of careful exploration." Only the Dalles mountain snail (*Oreohelix variabilis)* was cited as a species possibly found in the planning area.

The Blue Mountains is listed by Frest and Johannes as a center of endemism however they state that "This region was unfortunately not well explored in the early phase of western malacology and is now heavily impacted."

It appears that neither the upper John Day basin in the region of the North Fork John Day or the lower part of the basin have been well explored in the past and it therefore seems likely that other sensitive species of mollusks will be found in the planning area once those areas are adequately surveyed.

Wild Horses

The only wild horses in the planning area are located in the Murderer's Creek Herd Management Area. The herd management area spans 108,568 acres and is managed under the Wild Free-Roaming Horses and Burros Act of 1971 that mandates that these horses be managed in a thriving ecological balance with the land and as part of the natural landscape. The Bear Valley Ranger District of the Malheur National forest has primary responsibility for managing this herd and annually inventories the Murders Creek wild horse population with a ground census.

The Appropriate Management Level for this herd management area ranges between 50-140 wild horses. The wild horse herd averages about 100 head.

The lineage of the Murderer's Creek horses is diverse. Part of the lineage of horses found in the area by early explorers probably escaped from Indian herds assembled from horses escaped from or released by Spanish Conquistadors. It is also likely that many of the Murderer's Creek horses are descendants of animals lost or turned loose by settlers and ranchers.

Wild horse herds increase at a rate of 22-23 percent per year, so their populations, without controls, double about every 4 to 5 years. Wild horses have few natural predators, except for humans and mountain lions. Prior to the enactment of the Wild Free-Roaming Horse and Burro Act of 1971, wild horses were not federally protected species. Herd numbers were controlled by ranchers and by mustangers who hunted the horses or gathered them for sale. After the Act, the population control has been by mountain lions and the managing agencies, the Forest Service and Bureau of Land Management.

Mountain lions do an adequate job of controlling wild horse numbers in only a few locations. The size of most herds must be controlled by the managing agencies in order to protect the land from overgrazing and to protect the horses from eventual starvation due to overgrazing. It is for the health of the land and the health of the animals that excess wild horses are removed from their territories.

Wilderness Characteristics

The BLM reviewed and updated the wilderness inventory for 360,856 acres of public lands outside of designated Wilderness Study Areas, including the BLM lands contained in 13 citizens' wilderness proposals. The wilderness inventory update considered size, naturalness, and the opportunity for solitude and primitive, unconfined recreation. A total of 15,156 acres acres (outside of areas previously identified as Wilderness Study Areas) of BLM managed lands were found to contain Wilderness Characteristics.

Caves

Many resources are associated with cave features, including critical wildlife habitat, cultural resources, recreation opportunities, and paleontological resources. "Cave" is defined as any naturally occurring void, cavity, recess or series of connected passages beneath the surface of the earth or within a cliff or ledge large enough to allow a person to enter. It includes any natural pit, sinkhole, or other feature that is an extension of the entrance. Caves in the planning area have the potential to be significant as winter hibernacula or maternity roost sites for bats.

Caves in the planning area include features such as lava tubes, caves formed by pressure ridges associated with lava flows, and piping caves formed by moving water eroding insoluble rock. The locations of caves nominated for significance are considered confidential under the Federal Cave Resources Protection Act (FCRPA). Information concerning the specific location of any significant cave may not be made available to the public unless the disclosure of this information would further the purposes of the FCRPA and would not create a substantial risk of harm, theft or destruction of such cave.

Wildhorse Point Cave is the only known cave on BLM public land within the JDBRMP area determined to be significant by the BLM. This cave provides habitat for the western big-eared bat. The condition of Wildhorse Point Cave was excellent in the mid 1990s when it was inventoried.

Visual Resources

The John Day River Basin contains an abundance of high quality scenery. The variety of landscapes across the basin provides a visual smorgasbord for residents and visitors. The 13 subecoregions within the planning area provide scenery that ranges from broad vistas of rolling grassland, to rugged canyons, to mountain peaks flanked by forests. While much of the area appears to be relatively undisturbed, logging, grazing, fire suppression, mineral extraction, and the creation of infrastructure such as roads and utilities have left an imprint on the land and on the overall scenic quality. However, no major developments affect the visual resource values on public lands within the basin. The sparse population and relatively small population centers have left much of the region relatively natural appearing.

Both Congress and the BLM identified scenery as an outstandingly remarkable value for the federally designated John Day and South Fork John Day Wild and Scenic Rivers. Also, portions of the John Day River and it tributaries, North Fork, Middle Fork, and South Fork, have been designated as State Scenic Waterways under the Oregon Scenic Waterways Program.

The John Day River Canyon is a key visual element within the planning area. This canyon is generally primitive and undeveloped. Here the John Day River slices through a high basalt plateau; winding alternately through gentle farm valleys and a 1,000-foot deep canyon, cutting through a layer cake of basalt cliffs and steep rugged hills. Lush green riparian vegetation at the river's edge contrasts with green-golden hills of grass, sagebrush, and juniper in the summer and fall.

Exposed volcanic ash deposits and the erosion and oxidation of basalt columns have created unusual colors and interesting formations that have become scenic landmarks for river visitors floating the canyon. Tumultuous in its headwaters, the river is mostly calm in the lower reaches, though punctuated by the occasional rapid. In the summer as runoff dwindles, rapids become riffles and runs become long twisting ponds with little current. Sandy beaches and gravel bars appear at low water flows.

The North, Middle, and South Forks of the John Day River are also striking river canyons with varying basalt outcrops, vegetation and erosive features with high scenic beauty. Canyons along these river segments include vertical cliffs more than 500 feet high, composed of dramatic basalt rock outcrops.

Vegetation ranges from fir and pine trees in the uplands to high desert communities of sagebrush and juniper in the lowlands. Small outposts of different vegetative communities dot the landscape along the South, North, and Middle Forks of the John Day River and provide variety and a contrast for the eye. Ranches, intermingled with public lands, add an interesting contrast.

Sutton, Rudio and Stephenson Mountains are also prominent landscape features in the planning area. These landscapes are towering landforms, weathered over time. The remaining public lands contain important visual elements and contribute to providing open space views on plateaus and rolling hills.

The *Status of the Interior Columbia Basin; Summary of Scientific Findings Report* (USDA-Forest Service, 1996) contained several points of interest regarding scenic quality trends within the Columbia Basin consistent with the John Day Basin:

- 1 "By the year 2045, the most value to the increasing and older human population will be provided by (in decreasing order) motor viewing, day use, trail use, fishing, and hunting (p. 52)."
- 1 "Scenic integrity is reflected by the 'visual intactness' or wholeness of the landscape. Scenic integrity is not the same concept as scenic beauty, but research shows people frequently perceive scenic integrity and scenic beauty to be the same thing. Scenic integrity of USFS and BLM public lands were rated as: a) 42% very high, b) 33% high, c) 17 % moderate, d) 7% moderately low, and e) 1% very low (p. 54)." This ranking shows that the majority of USFS and BLM public lands have a natural-appearing landscape, rather than a disturbed appearance.
- 1 "…Local publics will be expected to continue to express preferences for stability in scenery and lobby to have projects put in someone else's back yard… (p.140)."

River Mile 47 west bank John Day River, Lower John Day Wilderness Study Area/John Day Wild and Scenic River

Except for newly acquired public lands on the North Fork of the John Day River, all public lands within the planning area have been inventoried according to the guidelines for BLM's Visual Resource Management (VRM) program. Previously inventoried public lands were assigned VRM management classes through the Two Rivers, John Day and Baker RMP/EIS process and the plan amendments instituted via the John Day River Management Plan.

Where steep natural barriers prevent motorized vehicle use, BLM lands have generally retained a higher level of natural appearance. In areas where the terrain makes motorized use feasible, new vehicle routes have been created, both authorized and unauthorized. The creation of new vehicle routes has affected the scenic quality of some areas, including public lands around Canyon City, Dixie Creek, South Fork of the John Day, and Rudio Mountain. Wilderness Study Area Interim Management guidelines that restrict motorized use to designated routes continue to be violated by some public land users and some adjacent private landowners. These activities also reduce the natural character of the landscape by creating new OHV routes.

Special Management Designations

Areas of Critical Environmental Concern

BLM has two Areas of Environmental Concern (ACECs) in the John Day Basin planning area: Horn Butte Curlew and Spanish Gulch. Both were designated through the Two Rivers RMP/EIS in 1986. These ACECs are shown on Map 9 Special Management Areas in Chapter 2.

Horn Butte Curlew ACEC is approximately 6,000 acres and is located five miles east of Arlington, in the extreme northeast corner of the planning area. Designated for its long-billed curlew nesting habitat, a management plan was prepared in 1989 proposing land acquisition, livestock management, noxious weed control and seasonal closure of the area to off-road motorized use. Implementation of all planned actions except OHV management is ongoing.

Since 1989 approximately 80% of the ACEC has been burned by wildfire. Long-billed curlew nesting habitat, consisting mostly of sites dominated by perennial grasses, has generally been enhanced. However, the shrub steppe, as expected, has been converted to sites dominated by annual species, including noxious weeds (yellow starthistle and medusahead). Approximately 1,500 acres has been re-seeded to perennial grasses, although establishment has been poor. Weed control is ongoing. Restoration of this area to shrub steppe and enhancement of its curlew habitat remains an ongoing process.

Spanish Gulch was designated an ACEC for its historic values. This ACEC is approximately 333 acres and is located approximately 12 air miles west-southwest of Dayville, Oregon, just north of the Ochoco National Forest. In the 1860s this was the site of active gold mining, following discovery of gold in the Canyon City area to the east. When the Spanish Gulch area was designated an ACEC, numerous historical structures remained on site, including a mill, storage buildings and residences. Since designation, little has been done to manage or protect this area and the structures have fallen further into disrepair. Spanish Gulch has been determined to be relevant but not important; it is not unique, although it was nominated to the National Register of Historic Places at the State level of significance primarily as a representative example of late 19th and 20th century hydraulic and lode mining equipment. Any remnants on site date from the early 1900s to 1930s and consequently are not representative of the 19th century. There are no active mining claims at present and the lack of public access serves to protect the site from disturbance.

Wilderness

Portions of five federally designated Wilderness areas (North Fork John Day, Black Canyon, Monument Rock, Strawberry Mountain, and Bridge Creek) are within the planning area, each managed by the U.S. Forest Service. The North Fork John Day Wilderness is located along the upper North Fork, Black Canyon Wilderness is located on the west side of the South Fork John Day, Monument Rock Wilderness is located at the southern end of the Blue Mountains, Strawberry Mountain Wilderness is located southeast of John Day and Canyon City, and Bridge Creek Wilderness is located in the Ochoco Mountains south of Mitchell.

Eight Wilderness Study Areas (WSAs) have been identified by the BLM within the planning area. The Strawberry Mountain WSA (1,151 acres) consists of three individual units that abut the north and east boundary of the Strawberry Mountain Wilderness Area (USFS). The Aldrich Mountain WSA (9,131 acres) is located on the east side of the South Fork John Day River near Dayville. The Spring Basin WSA (6,481 acres) is located south of Clarno on the east side of the mainstem John Day River. The North Pole Ridge WSA (7,300 acres) is located north of Clarno on the mainstem. Further north along the mainstem is the Thirtymile WSA (7,625 acres) and the Lower John Day WSA (25,393 acres). Two additional WSAs, Sutton Mountain (28,894 acres) and Pat's Cabin (9,778 acres) are located just south of the mainstem John Day River near Bridge Creek.

In the Wilderness Study Report (DOI-BLM,1991), the BLM recommended that most of the acres contained in four WSAs be designated as Wilderness by Congress including Thirtymile, Lower John Day, North Pole Ridge, and Spring Basin. The report did not recommend Wilderness status for the Strawberry Mountain WSA or the Aldrich Mountain WSA. Lands acquired after 1991 were inventoried for wilderness characteristics, and those found to meet the WSA criteria, including Sutton Mountain WSA, Pat's Cabin WSA, and a 1,240-acre addition to the North Pole Ridge WSA, were amended to WSA status through earlier planning documents.

The largest current threat to the WSAs is the unauthorized use of motorized vehicles and the creation of new routes through this use. Off-road motorized trespass is presently occurring in nearly every WSA within the planning area. This unauthorized OHV use is usually associated with hunting, scouting for game, and horn hunting, and the routes often originate from adjacent private land. Other unauthorized activities are threatening individual WSAs. In Sutton Mountain WSA, the unauthorized cutting of old-growth juniper trees is escalating, associated with the recent popularity of hand-crafted juniper furniture. In the North Pole Ridge, Thirtymile, and Lower John Day WSAs, unauthorized motor vehicle use is increasing as single engine aircraft land on sagebrush flats along the river. The BLM has investigated cases where chainsaws have been used to remove vegetation to facilitate landing, aircraft tie-downs have been installed in the ground, and chainsaw fuel containers have been stashed.

Wild and Scenic Rivers

On BLM managed public land in the planning area, there are two segments of river designated as Wild and Scenic (Omnibus Oregon Wild and Scenic Rivers Act of 1988, Public Law 100-558). These segments are described below, and shown on Map 9: Special Management Areas. For a complete description of the existing Wild and Scenic River segments see the John Day River Plan, USDI-BLM, 2000.

- **Lower John Day River Mainstem** from Tumwater Falls upstream to Service Creek (river mile 10 to river mile 157) is classified as "Recreational" and flows through a number of colorful canyons, broad valleys, and breathtaking terrain. A recreational river is defined as a *river or section of river that is readily accessible by road or railroad that may have some development along their shorelines and that may have undergone some impoundment or diversion in the past*. This segment offers notable steelhead and smallmouth bass fishing; mostly flat water boating punctuated with a few rapids; and sites of archeological, historical and paleontological interest. Scenery, Recreational Opportunities, Fish, Wildlife, Geology, Paleontology, and Archeology have been identified as Outstandingly Remarkable Values associated with this 147 mile section of the river.
- **South Fork John Day River** from Smokey Creek upstream to the Malheur National Forest boundary (river mile 6 to river mile 52) is classified as "Recreational" (see above definition) and offers outstanding scenery, hunting, hiking, swimming and camping. Scenery, Recreational Opportunities, Fish, Wildlife, and Botany have been identified as Outstandingly Remarkable Values associated with this 47 mile river segment.

Trends in the condition of BLM managed Wild and Scenic River (WSR) within the planning area have been largely positive. Implementation of Wilderness Study Area interim guidance (USDI BLM, 1995), the John Day River Management Plan guidance (USDI BLM, 2001), and a joint BLM and NPS Law Enforcement Ranger have helped to protect Outstandingly Remarkable Values such as scenic quality, recreation, fisheries, camping and dispersed recreation on the main-stem and South Fork John Day Rivers. Changes include improved communication with users, an emphasis on Leave No Trace ethics, improved riparian habitat through compatible grazing management, and increased on-site management of these rivers.

In addition to the segments of WSR on BLM managed land, there are several WSR segments that cross USFS managed public land within the planning area:

- **North Fork John Day River** from its headwaters downstream to Camas Creek, managed by the Umatilla National Forest. One portion of this segment is classified as "Wild"; two portions are classified as "Scenic"; and two are classified as "Recreational." This segment runs through forested land, and the river's cold waters are important for rearing of anadromous fish. The diverse landscape provides important wildlife habitat, high quality scenery, and recreation opportunities. Old homesteads, remnants of mining activity, and other manmade structures have a primitive appearance that testifies to a rich history including an era of gold exploration that began in the 1860s.
- **Malheur River** and the **North Fork of the Malheur River**, managed by the Malheur National Forest. The outstandingly remarkable values on these segments include fisheries, wildlife, recreation, scenery and geology.

These are the existing WSRs within the planning area. Prior to beginning the John Day Basin RMP, the BLM also considered whether additional segments might be eligible for WSR designation. In May 2005, the BLM Prineville District reviewed 1,400 miles of waterways on BLM public land within the John Day Basin planning area. The District also evaluated data from the Northwest Rivers Study, the Northwest Power Planning Council Protected Rivers, and the Nationwide Rivers Inventory (USDI-NPS 2004).

After initial evaluation, the list of potential segments was narrowed to 18 waterways totaling about 93 miles. The BLM enlisted a private contractor with eligibility assessment expertise to conduct a detailed inventory of these waterways to determine if they met WSR eligibility criteria. This assessment determined that North Fork John Day River bounded by BLM managed lands between river mile 20.43 North of Monument and the confluence of Camas Creek met eligibility criteria (See Appendix I-1 for the complete eligibility assessment and Appendix I-2 for the Eligibility Decision).

There are also segments of river on BLM managed public land that are considered State Scenic Waterways (SSW). The SSW program is administered by the Oregon Parks and Recreation Department, which has developed both statewide and river specific rules. These rules specify management objectives for development and uses within SSW corridor to maintain the natural beauty of the river. About 317 miles of the John Day River are included in this program.

Special Road Designation

State Scenic Byway

The Journey Through Time Scenic Byway, designated by the Oregon Department of Transportation is approximately 286 miles long and starts at Biggs, Oregon and ends in Baker City. This Scenic Byway explores the history and geology of the route, connecting small towns from north central Oregon to Baker City and the Oregon Trail Historic Center in eastern Oregon.

BLM Back Country Byway

BLM's Back County Byways program designates special roads that cross BLM land and are noted for their scenic attributes. There are two types of Back Country Byways. Type 1 byways have a paved or all-weather surface. Type 2 byways are generally not paved but frequently have improved gravel surface.

The South Fork John Day River Back Country Byway is the only BLM byway within the JDBRMP. This Byway parallels the South Fork of the John Day River through its windy canyon for approximately 50 miles from Dayville to the Malheur National Forest boundary. Fishing, hiking, primitive camping, and excellent views are available along this roadway.

Forest Service Byways

The Blue Mountain Scenic Byway offers a variety of scenery along with historical sites and numerous recreational opportunities. Several sites of national or state significance are the crossing of the Oregon Trail (a National Historic District), the Wild and Scenic John Day River, and the North Fork John Day Wilderness. Also located along this route is a state-managed wildlife area and remnants of historic mining activities and settlements. The area traversed by this scenic route contains one of the largest Rocky Mountain elk herds in the nation.

The Elkhorn Scenic Byway is located on the Wallowa-Whitman National Forest. This Scenic Byway is a 106-mile loop through the Elkhorn Mountains; a country rich in scenery, history, geology, and natural resources. Different recreational opportunities are available along the way, including hunting, fishing, camping, picnicking, boating, skiing, and hiking. Special points of interest include gold mining operations and the historical narrow-gauge railroad grade. Signs along the way mark special points of interest and road junctions. The entire route is paved, however in the winter, the route is not snowplowed between Granite and Anthony Lakes.

Research Natural Areas

There are no Research Natural Areas within the planning area.

Other Areas Designated for Special Management

The Phillip W. Schneider Wildlife Management Area (formerly Murderers Creek Wildlife Management Area) was established along a portion of the South Fork John Day River in 1972 by the ODFW and the BLM to better manage mule deer winter range. The area is now used by mule deer, elk, and bighorn sheep year-round and pronghorn during all but the winter season. Several thousand mule deer use the area during severe winters. This area also provides habitat for wild turkey, chukar, mountain quail, California quail, and a host of neotropical migratory birds.

The State of Oregon established the John Day Wildlife Refuge in 1933 along the lower mainstem of the John Day River. The primary purpose of this refuge is to protect wintering and nesting waterfowl. It includes all land within ¼ mile of the John Day river mean high water line from the Columbia River upstream to Thirtymile Creek. No waterfowl hunting is allowed in this area. The area is open to deer and upland game bird hunting during authorized seasons, but hunting of these species on private lands within the refuge requires land owner permission.

Paleontology Resources

The BLM's Paleontology Resource Management Program is responsible for managing fossil resources on lands it administers. Management is directed primarily by provisions in the Federal Lands Policy and Management Act of 1976, the National Environmental Policy Act of 1969, a variety of other federal regulations and policies, and the BLM's Paleontology Resource Management manual (8270 and H-8270-1, as amended by the appropriate Instruction Memorandum). The objective of paleontology resource management is to facilitate the appropriate scientific, educational and recreational use, such as research and interpretation.

Paleontology resources on public lands are considered a fragile and non-renewable scientific record of the history of life on earth, and so represent an important and critical component of America's natural heritage. There are three main types of fossil resources, vertebrate (representing animals with backbones), invertebrate (animals without backbones) and botanical (leaves and wood). These include trace fossils, which consist of skin impressions, burrows, casts and trackways. Locations on the ground where fossils occur are known as localities, not sites. Geologic settings may also constitute a paleontological resource when associated with fossils or significant processes that created contexts for fossil preservation.

Fossils tend to be associated with areas of land that have no or very little vegetation and expose the underlying rock layers. Sometime this is in small areas measured in square feet or larger areas encompassing many acres. Each exposure may or may not produce fossils. This is a characteristic of the preservation of large landscapes and what portion of that landscape is exposed to view. Not all parts of the ancient landscape had features that are necessary for animals or plants to become preserved. Exposures with fossils are known as localities. Some exposures are steep in nature like in the upper John Day river canyon, while others may be more in a horizontal position as exhibited in the plains adjacent to the Columbia River. Fossils are impacted by natural processes and human actions. Natural erosion or weathering expose fossils to the elements which makes them deteriorate rapidly and break apart. Thus, their physical structure and species type becomes unidentifiable. On steeper slopes, weathering and gravity will dislodge fossils from their geologic context. Once the context is compromised, the inherent information value of individual specimens is lost. Ground disturbing projects or illegal collection of fossils by individuals similarly destroys or removes fossils from their context with the same result. Most fossil localities in the planning area appear as steep eroded badlands best avoided by most planned projects. However, projects implemented in close proximity to localities can have indirect consequences by providing easy access to individuals who inadvertently or purposefully collect fossils from their original context.

Fossil localities are scattered differentially throughout the John Day basin. What type and age of fossil one finds depends on the exposed rock unit. Most fossil resources from the Tertiary Period (54 to 5 mya within the planning area are found between Thirtymile Creek in the lower John Day River canyon and Monument on the North Fork and around Dayville along the South Fork of the John Day River. Many of the better known localities are associated with and surround the John Day Fossil Beds National Monument (NPS) and contribute significantly to filling in gaps in the rock sequence not exhibited within the NPS boundary.

Between the towns of Clarno and Spray are rocks from the Cretaceous Period (144-65 mya). These rocks produce a moderate amount of invertebrate fossils (primarily shell fish (mollusks), though a few rare joint-legged creatures (arthropods) and even more rare vertebrates have been located). This same area produces some Pleistocene fossils (less than 2 mya) as well. The Prineville District office has on display a mammoth tusk removed from a creek within this area. Other Pleistocene fossils (bison) have been reported in the upper stretches of the South Fork John Day River. Pliocene fossils (5-2 mya) also have been reported from the northern portions of the John Day basin near the Columbia River (Fremd *et al.* 1994; Orr and Orr 1999).

Existing Condition

Through an interagency agreement between the NPS and the BLM, the NPS maintains a database of recorded fossil localities within the Prineville District that fall within their scope of collections (50-5 mya), as well as professional evaluation of significance. There are 155 such fossil localities recorded on BLM managed lands in the planning area. The majority of these localities are known to occur in rocks that produce or are highly likely to produce noteworthy examples of vertebrates, invertebrates and plant fossils. There are additional localities, some

older and some younger, that are known but have not been recorded. There are no known paleontology localities within the Baker Resource Area portion of the planning unit.

Trends

Volcanic lava flows covered and preserved much of the older sediments in the John Day basin from erosion. The lava cap is the principal reason fossil resources and their geologic contexts are so well represented in the basin. Erosion is both friend and foe to fossil management. Erosion exposes fossils to the elements which begins a fairly rapid process of deterioration but also reveals them for study. Fossils are also subject to human impacts through illegal collecting and vandalism. Some fossil types (for example, invertebrates and petrified wood) are subject to legal recreational collecting (authorized under 43CFR3620 – Petrified Wood, and under 43CFR8365 – Common Invertebrate Fossils), though there are no identified public collecting areas within the planning unit.

Cultural Resources

The BLM's Cultural Resource Program is responsible for managing a variety of non-renewable resources related to archaeology, history, architecture and tradition. A cultural resource or cultural property is "a definite location of human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence." The term includes archaeological, historic or architectural sites, structures, or places with important public and scientific uses, and may include definite locations (sites or places) of traditional cultural or religious importance to specific social and/or cultural groups"(USDI-BLM Manual 8100). Cultural resources are divided into isolates and sites. Isolates are defined as less than 10 cultural artifacts found in a discrete area. Sites are defined as 10 or more cultural artifacts with or without features in a discrete area. Site types known for this area include but are not limited to American Indian stone tool making scatters, rock shelters, remains of living structures, pictographs/petroglyphs, rock stacked features, burials, historic homesteads/living structures or their remains, roads/trails, irrigation ditches, stock raising and management features, cemeteries, ferry crossings, mining features and equipment, prohibition era stills, wagon remains, and features related to logging activities.

Once identified, cultural resource sites are evaluated and managed according to two different sets of criteria:

- 1 Criteria of the National Register of Historic Places. Eligibility for listing on the National Register of Historic Places is assessed using criteria that addresses site integrity and considers its association with significant events, or significant persons, whether or not the property embodies the distinctive characteristics of type, period, or method of construction or represents the work of a master, or has yielded, or may be likely to yield, information important in prehistory or history. The method(s) used to arrive at these criteria must, at a minimum, meet or exceed the Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation (NPS, 48 FR 44716, September 29, 1983).
- 1 Criteria of the management use categories of the BLM (BLM Manual Section 8110.42). Six BLM management use categories (scientific use, conservation for future use, traditional use, public use, experimental use, and discharge from management) are employed to provide for site protection and use standards. Although some scientific and experimental uses result in the physical alteration of resources, in general, use does not imply consumptive use. Managed use of cultural resources can be fully compatible with long-term preservation, and also provides the means by which preservation is achieved.

Prehistoric Resources

On a regional basis, the John Day basin has been influenced through time by what is perceived as two distinct cultural areas – the Columbia Plateau to the north and the Great Basin to the south. Both of the larger cultural areas have their separate characteristics. The Columbia Plateau cultures are generally focused on river systems taking advantage of the elevation changes in that system to provide resource availability throughout the different seasons. Fish, berries and roots are important resources in this culture area. Resource storage and semi-permanent dwellings are key features for this area. Great Basin cultures focused on internally drained lake basins and other water features. Similarly, the Great Basin cultures take advantage of resource availability afforded in areas with

relatively close elevation changes. Rabbits, waterfowl and roots are important resources. Storage and temporary shelters are key features. Both groups developed relationships across and moved seasonally between these geographic areas as a hedge against food shortages and to increase the viability of their respective populations.

Prehistoric sites of archaeological interest are scattered throughout the planning area. They are most commonly found in certain environmental locations that are heavily influenced by the existing geology/terrain. For example, there is a high potential to find prehistoric sites near any water course or body, like rivers, streams, springs and lakes. Similarly, ridges and breaks (abrupt changes in topography) are likely spots to find evidence of past use or occupation. Steep slopes and rocky ground are less likely to have cultural resources of relevance, though there are exceptions.

Historic Resources

The history of the John Day basin varies from north to south. Exploration occurred early in the lower stretches of the river system, the most notable being the Lewis and Clark expedition. This group passed the mouth of the river on both their descent and ascent of the Columbia River in the early 1800s. The river derives its name from a fur trapper, John Day, a member of the Astor party of 1811-12, who lost his way in the Blue Mountains and was rescued near its mouth. The river basin was not explored again until the early 1860s when gold was discovered at Canyon City in its upper reaches. That event set in motion the settling of the interior of the state that lasted until the 1920s. The boom and bust character of mining led quickly to the realization that the John Day basin was most suitable for farming and ranching, particularly the latter. In the lower stretches of the river, grazing started early but by the 1880s, became subordinate to dry-land farming which continues to this day. In the upper stretches, grazing came shortly on the heels of the mining boom and was dominant until the 1930s. In the 1930s, technological changes allowed the previously inaccessible area to be opened to motorized logging. Lumbering in the upper basin became dominant over the next 50 years.

The location of historic sites is similarly influenced by the geology/terrain and availability of water. Gold mining site locations are mostly restricted to the upper basin. Placer and lode mining are the primary techniques used to extract the ore. Only lode mining occurs today. Key mining areas are near Canyon City, location of the original gold discovery, and Dixie Creek, near Prairie City. The key transportation route into this area was The Dalles-Canyon City Wagon Road. Segments of this historic road still exist within the planning area. Level lands adjacent to rivers, streams and springs in lowland settings provided good locations for homesteads/ranches/farms and associated features. Most of these areas are on private lands today. However, mid-slope and upland settings may contain features or sites related to different parts of the ranching land use system. Most early ranching occurred in the mid- to upper reaches of the basin, except near the mouth of the John Day river. Later ranching is more evenly distributed, though the main ranch sites are mostly in private hands. The key areas in the planning area related to early ranching are in the Bridge Creek drainage and near Clarno. Logging on any major scale was relatively late (after 1930) in the planning area due to limited access in the rough topography. Lumbering sites are typically found in forested areas, though some processing sites may be located in an adjacent non-forested setting.

Existing Condition

Archaeological resources are fragile, non-renewable resources. Many natural processes and human activities can damage the information value of archaeological remains at a site when the ground surface or subsurface is disturbed and site context becomes mixed or churned, artifacts or features are damaged, and site integrity is disrupted or destroyed. Change to site setting can also be affected by such disturbances. The degree to which these natural processes and human activities affect a site will depend on the site type, the setting, and the nature of the process/activity. Natural processes (such as intense thunder storms, catastrophic fires, or rodents) can be quite destructive to site condition and integrity. Human activity on a site can also be quite damaging. Artifact collecting, unauthorized digging, bulldozing, and concentrations of livestock or people are just a few of the actions that can have negative effects on cultural resources.

The BLM Prineville District, in conjunction with the US Forest Service (Deschutes and Ochoco National Forests) has created the Oregon Heritage Information Management System (OHIMS) database to most effectively meet its responsibilities under federal laws and guidance, as well as planning objectives for cultural resources within

the broad region these land management agencies administer. The basis for the database and the various site attributes it captures is a land-use systems model that has been applied in the region over the past decade or more (Schalk and Atwell 1994; Lebow *et al.* 1990; Burtchard 1998; Zancanella 1998) and forms the basis for context that allows the agencies to address site significance and management direction.

There are 439 archaeological site records currently in the OHIMS database for the John Day basin. Because data entry into the database is ongoing, this is not the exact number of known sites in the planning area. For the most part, these cultural resources are distributed within the John Day River canyon, from the mouth to the upper reaches, and represent a wide variety of site types related to history and prehistory. Few places in the planning area outside the river canyon are included in the database. Of note are Rudio Mountain, Johnson Creek area, Sutton Mountain/Pat's Cabin area and the Muddy Creek area. The OHIMS database site record includes a condition attribute with several qualified selections. Of the 439 sites, 144 (33%) have Unknown condition which probably reflects older data where site condition was not noted. The remaining 295 sites (60%) have been assigned a condition attribute. Of these 295 sites, 46 (16%) are Excellent, 119 (40%) are Good, 39 (13%) are Fair, 79 (27%) are Poor, and 11 (4%) are Destroyed. Multiple agents have contributed to the condition of these sites (see above).

The Dalles-Canyon City road, homesteads in the Sutton Mountain area and lower John Day River segment, and the Dixie Mining District were identified as possibly suitable for nomination to the National Register (Lebow *et al.*, 1990). One other area was mentioned as possibly needing evaluation for nomination to the National Register. That area involved two separate clusters of prehistoric sites within the lower John Day River segment that were proposed as Archaeological Districts. One of these districts has an historic component. Two segments of the Oregon Trail in the northern portion of the planning area have been nominated to the National Register of Historic Places. The Fourmile Canyon segment was nominated at the National level of significance in 1975. The John Day Crossing (McDonald crossing) segment was nominated at the Local level of significance in 1976. Both nominations were approved at the Oregon State Historic Preservation Office (SHPO).

The following interpretive sites have been developed by the BLM and cooperators: ramadas with interpretive signs were constructed at Fourmile Canyon and John Day River Crossing (west side, McDonalds crossing) segments of the Oregon Trail. The BLM John Day River Crossing interpretive site was placed on land owned by the Sherman County Historical Society through a Cooperative Management Agreement.

Trends

Cultural resources are non-renewable resources that are affected constantly by natural factors and sometimes by human actions. As such, most sites tend to deteriorate over time and some are subjected to vandalism and/or pilfering.

People in the John Day Basin

The remainder of this chapter describes how people use the many resources of the John Day Basin. The initial discussion focuses on the Social and Economic Context then the discussion addresses a series of uses and management categories that are important considerations for the decisions to be made in during the John Day Basin RMP planning process.

Social and Economic Context

The planning area is primarily composed of three Oregon counties – Grant, Wheeler and Gilliam. Portions of several other counties also occur within the planning area: Baker, Jefferson, Umatilla, Sherman, Wasco and Morrow. Gilliam, Grant and Wheeler counties are contained almost entirely within the John Day Basin and draw their social and economic character from the planning area. Sherman, Wasco, Morrow and Umatilla counties include portions of the Interstate 84 corridor and benefit from the more diverse social and economic opportunities a thoroughfare of this nature offers. Jefferson County has closer social and economic affiliations with the Central Oregon area. The following description of the John Day Basin social and economic environment will focus more on the counties entirely contained within the planning area (Gilliam, Grant and Wheeler), that function

within that geographic context. These counties reflect similar trends and values in the remaining counties that make up small portions of the planning area. Special attention will be given to smaller communities that contain characteristics unique to the area.

Certain defining features of every area influence and shape the nature of local economic and social activity. Among these is the local history, population, the presence of or proximity to large cities or regional population centers, types of longstanding industries such as agriculture and forestry, area racial and cultural characteristics, predominant land and water features, and unique area amenities.

Inhabitants

American Indian Social Setting

The study area was occupied and utilized at various times by both Plateau and Great Basin groups when Europeans first arrived. There have been a number of ethnographies compiled for the planning area (Stewart 1939; Blyth 1938; Ray 1939; Murdock 1938). All of these were written in the early part of the twentieth century, well after acculturation had taken place. This information will not be recited here because it has been adequately synthesized in several publications, including Lebow *et al.* (1990) and Connolly *et al.* (1993). Other relevant documentation includes Suphan (1974), Couture *et al.* (1986), Zilverberg (1983), and Hunn (1990). The following discussion highlights the seasonal rounds of the separate language and cultural groups within the planning area.

Plateau groups at the time of contact were utilizing the planning area on a seasonal basis. Winter villages were located on the Deschutes River and its tributaries or along the lower John Day River. During late spring family groups would begin to head for the higher elevations of the Blue Mountains to take advantage of ripening root crops and/or to attend annual gatherings in selected settings. Hunn (1990: 127), for example, notes that hundreds of people would gather in Fox valley in late June to harvest camas. Bitterroot and lomatiums, however, occur in patchy steep shallow soils and are better harvested by small groups. The rest of the summer and into the fall, family groups would utilize primarily the uplands, gathering, hunting, fishing, processing, preparing and possibly some storing of a variety of plant and animal resources. Fishing in the uplands seems to be oriented more towards spawning lampreys, native trout, white fish, and suckers than to Spring salmon runs, although they would have been taken as well. Of particular interest for the planning area is the gathering of nuts and berries which probably played a more important role for subsistence than normally expressed. In fact, given the apparent limited availability of anadromous fish in the upper reaches of the John Day River system, there may have been a scheduling conflict between nut/berry collecting in the uplands and the highly sought after fall salmon runs along the Columbia River. Excess stores of roots, nuts, and berries were apparently hauled back to lowland villages for winter use. This implies that substantial travel routes would have been established between regularly visited uplands and more permanent occupation sites lower in the river system.

Relative to the planning area, northern Great Basin groups wintered in two, possibly three, areas. These include Harney Valley, Canyon City/John Day area, and probably the lower stretch of Murderers Creek along the South Fork John Day River. The gathering and scattering of small groups during particular seasons in response to resource availability is characteristic of the Northern Paiute. Supplementing dwindling winter stores was always a concern, therefore, hunting and foraging continued throughout the leaner months. The coming of spring, however, caused small groups to range out in search of the first roots and greens. Fox Valley, Bear Valley and Stinkingwater Mountains were favored root gathering areas where many groups gathered to share in the harvest and participate in other social activities. Great Basin groups appear to have been more mobile in their seasonal round after the spring festival. The search for food ranged from the Blue Mountain uplands to the lowland settings to the south and back again. These activities were typically performed by small family groups and included a wider range of resources than recorded for Plateau groups. Roots, like in the Plateau, were a primary food source, though grass and wada seeds, rodents, rabbits, crickets and some salmon were also important. The collection of particular plant or animal species, such as wada seeds and rabbits, were occasions for more festivals. In the fall, groups would head to the uplands again to collect pine nuts, berries, and to hunt deer and elk. Meat and plant resources were dried during this time for winter use. After the fall harvest, groups headed back to wintering locations.

The ethnographies for this region note that there was much animosity between these competing groups, though this may simply reflect the stress both groups were experiencing due to demographic dynamics caused by

disease, the effects of the horse, western technology, and Euroamerican expansion generally (Hanes 1995). A more representative view might be one in which relations were generally amicable with only minor conflicts occurring as isolated incidents.

Europeans

Historically, the John Day basin was peripheral to the early exploration of the area. From 1800 to 1843, explorers from Lewis and Clark to John C. Fremont skirted or passed through the John Day country. In fact, the John Day River was named for an early trapper with the Astor party of 1811-12. The fur trade promoted most of the early exploration and included Peter S. Ogden of the Hudson Bay Company (1828-1829), John Work of the same company in 1830-31, and Capt. Bonneville, US Army (1832-33). The explorations of John C. Fremont in 1843 brought to a close the period of exploration. Fremont passed along what would very shortly become the Oregon Trail, the major route to westward expansion.

For nearly 20 years emigrants from the east filed through the planning area along the Oregon Trail on their way to the lush Willamette Valley. Few stayed on the east side of the Cascade Range. In 1855, a fort was established at The Dalles. That same year, treaties were signed between the US government and the regional tribes which established the Warm Springs and Umatilla Indian Reservations. Both these tribes ceded lands to the US Government but retained certain rights to continue traditional practices, such as gathering, hunting and fishing. Periodic conflicts between Native populations and Euroamerican settlers would continue until the end of the Bannock Wars in 1878. These conflicts effectively kept many settlers out of the interior. The Dalles became the early regional military and supply center for central Oregon. The military was there to protect travelers along the Oregon Trail. They also promoted exploration of travel routes through the interior to establish links to other regional forts. When gold was discovered at Canyon City in 1862 the military took on the added responsibility of protecting miners on their way to the isolated mines from Indians as well as robbers and highwaymen. One of the routes the military explored became The Dalles-Canyon City road. This road became the major route to the Oregon interior and contributed importantly to its settlement. Shortly after the rush the gold played out. Many miners moved on to the next "El Dorado" but some turned to stock raising and farming in the lush valley floor and the grassy hills of the upper John Day country. In the 1860s the route of the Oregon Trail became The Dalles-Walla Walla Road, ferrying goods and supplies east and west along the Columbia River, crossing the John Day River at what is now McDonald Crossing.

Ranching was the economic foundation of the early emigrants in the John Day basin. Cattle, sheep, horses and hogs were all raised within the basin depending on market demand. In the southern Columbia Plateau portion of the planning unit ranching was supplanted by dry-land farming after 1878 and agriculture has been dominant ever since. In the Blue Mountains, ranching was an obvious land use that became the lifeblood of commerce for the next 50 years. Initially, only a few hardy souls were willing to settle in the Blue Mountains at great personal risk to attacks by Indians in the 1860s. Early homestead/ranches occurred in the Bridge Creek basin (1863), the Clarno-Pine Creek basin (1866) and Kahler basin (1869). Ranching continued through the 1870s in the Blue Mountains with high stocking levels and open range grazing. By the end of the 1870s the threat of Indian attacks had disappeared and settlement of the area accelerated. Throughout the 1880s and 1890s the open range grazing of central Oregon began to experience stress. Increases in people attempting to ranch, costs of fencing the range and poor markets contributed to the decline in large cattle ranches. Some of the ranches turned to raising sheep because of better market conditions. All of the ranches began to experience shortages due to the increased pressure on the forage. The competition for forage created by this situation led to the infamous cattle vs. sheep "range wars" of the late 19th and early 20th centuries. Sheep were slaughtered by the thousands -and a few herders- by cattlemen determined to rid the area of the dreaded sheep. In part to settle the conflict, the US Government began to establish the Forest Reserve system or Forest Service to regulate the access and amount of grazing that would occur in the forested regions.

The land use of lumbering had its initial beginnings in the 1860s at Canyon City. The impact was local because the demand was local. The terrain of the John Day created an effective barrier to the technology of the 19th century. The timber industry of the John Day country didn't really begin until the 1930s when the technology improved enough to open up vehicle access to the interior. There was a minor bit of railroad logging near Prairie City that crept into the district from Sumpter to the north and Hines from the south. Truck logging was the main mode of transporting logs to mills in the John Day basin. Broad-scale road construction and tractor logging continued on public and private lands up to the 1980s. These uses continue today, but to less extent (Lebow *et al.* 1990; Beckham and Lentz 2000).

Grant County was established in 1864 from portions of Wasco and Umatilla Counties, making it the largest county in the state at that time. Subsequent boundary revisions through land transfers to Lake County (1874) and the creation of Harney (1889) and Wheeler (1899) Counties have shrunk Grant County to its present day configuration. The discovery of gold in the area in 1862 served as the impetus for population growth, and also created the original economic foundation. Within days of the discovery approximately a thousand miners were camped along the banks of Canyon Creek near present day Canyon City. Gold and placer mining has since declined in economic importance, but a diminishing number of tenacious prospectors and miners can still be found carrying on the legacy that first drew settlers to this area. As mining declined farming and ranching grew in economic importance. In addition Grant County, which includes parts of four national forests, became largely dependent on forest product industries. As forest activities have waned in the last several decades, Grant County still provides a home and limited resources to several lumber mills. Most recently recreational tourism has provided some economic benefit to the county. Hunting provides a flood of visitors to the area in late summer and fall as thousands of enthusiasts migrate to the area for several days to weeks at a time. The local towns provide limited services to these visitors through the end of hunting season, till the higher level of activity is replaced with the familiar calm of day-to-day living (Oregon State Archives, 2006).

Wheeler County was and still is mostly a ranching community with families close enough together to form small towns. After the discovery of gold in Grant County, The Dalles-Canyon City Military Road was established to connect the prospering gold fields with the government in The Dalles. To reduce Indian attacks to travelers this road utilized the existing mail route through Mitchell. As a result by 1884 Mitchell was a flourishing area – even sporting a hotel. The northern portions of the county witnessed the creation and demise of several logging based communities between the 1930s and 1970s (Oregon State Archives, 2006). The county is internationally known for an extensive depository of fossils from the Cenozoic Era (USDI National Park Service, John Day Fossil Beds 2006).

Native Americans first inhabited the Gilliam county area and used trails across the grasslands, to reach fishing, hunting, foraging, and trading areas. The first non-native people in the area were immigrants following the Oregon Trail to the Willamette Valley. Raising stock dominated the early settlement economy until 1878 with the advent of dry-land farming. This transition lent itself to the areas long standing and dominant agricultural tradition in wheat and barley. The Northern Pacific Railroad along the Columbia was constructed in 1883 which was followed by a line from Arlington to Condon in 1905 (Toepel *et al.*, 1979 pg 139). The advent of this transport system irrevocably changed the nature of good and service exchange, enabling development of the areas agricultural economy. While ranching preceded farming it still plays a role in the local economy and residents find connection to the land through this tradition. Today recreation, wind generation, apples and other irrigated crops are becoming increasingly important (Oregon State Archives, 2006).

Cultural Identity

> "People want enough growth to keep the school and the town going, but not enough to change the lifestyle." [North Fork Community Resource Unit]

Cultural identity within the John Day Basin varies, as shown in a recent report from community field work commissioned by the BLM. The report suggests residents in Grant County relate in terms of cultural identity to Baker city and La Grande than to Bend for regional affiliation. In essence Grant County residents consider themselves part of "Eastern" Oregon. Residents in Wheeler County relate more to Prineville and Bend than to the Columbia River area or Baker County area. Wheeler County residents consider themselves part of "Central" Oregon, or "High Desert." Gilliam and Morrow County residents are part of the Columbia Plateau and generally relate to Pendleton, Hermiston and Tri-Cities for regional affiliation (Preister *et al.*, 2006).

As new residents move in ranches are bought up and public land experiences increased use by recreationists. Many of these new residents and tourists are attracted by natural amenities and the western cultural appeal of the area which has been recently designated as Oregon's Rugged Country (State of Oregon, 2007). Traditional ways of life rooted in timber and range remain culturally important in the area. BLM plays a role by providing valuable resources to these traditional timber and ranching communities but must increasingly also provide for more recreation demand.

Demographic Overview

"There were 20 kids around here years ago. Now there are 2—mine." [Monument]

According to the US Census Bureau, Gilliam County's population increased by 4.5 percent between 1990 and 2005. Grant County's population decreased by seven percent between 1990 and 2005 with a slight increase between 1990 and 2000. Between 1990 and 2005 Wheeler County experienced an overall 4 percent increase in population with a slight decrease in population between 2000 and 2005 to 1,455. In terms of population, Wheeler County has fewest people of any county in Oregon and it still has less than half the population it had at its peak in the 1950s (Oregon State Archives, 2006) (See Table 3-14 below). Sherman County has the second smallest population followed by Gilliam County. Wheeler County has the states second smallest population density, Gilliam is fourth, Grant fifth, and Sherman is sixth (US Census Bureau, 2005) (See Table 3-13).

Commuting data for both Grant and Wheeler counties suggest they are bedroom communities since income derived from people commuting out of the county to work exceeds the income from people commuting into the counties (USDC Bureau of Economic Analysis, 2004). Gilliam County can be described as an employment hub since income derived from people commuting into the county to work exceeds the income from people commuting out of the county. The degree of commuting varies; in 2004 11.7 percent of total income was earned at places of employment outside of Wheeler County while only 2.8 and 5.9 percent for Grant and Gilliam counties respectively. These shares have increased (from 3.7, 1.2, and 3.9 in 1981) suggesting this trend may be increasing.

Table 3-14. Population Change in Counties and Towns within the Planning Area

	1990	2000	2005		change
OREGON	**2,860,375**	**3,431,070**	**3,641,056**		**27.3%**
Gilliam	**1,717**	**1,915**	**1,794**		**4.5%**
Arlington	425	524	490		15.3%
Condon	635	759	708		11.5%
Grant	**7,853**	**7,935**	**7,297**		**-7.1%**
Canyon City	648	669	597		-7.9%
Dayville	144	138	122		-15.3%
John Day	1,836	1,821	1,605		-12.6%
Long Creek	249	228	202		-18.9%
Monument	162	151	134		-17.3%
Mt Vernon	538	595	531		-1.3%
Prairie City	1,117	1,080	965		-13.6%
Seneca	191	223	199		4.2%
Sherman	**1,918**	**1,934**	**1,749**		**-8.8%**
Grass Valley	160	171	153		-4.4%
Rufus	295	268	235		-20.3%
Wasco City	374	381	341		-8.8%
Wheeler	**1,396**	**1,547**	**1,455**		**4.2%**
Fossil	399	469	435		9.0%
Mitchell	163	170	158		-3.1%
Spray	149	140	130		-12.8%

Source: US Census Bureau, Population Finder

The population in all three counties has aged since 1990. Wheeler County is comparatively older with an average age of 48.1 years – up from 44.1 years in 1990. Between 1990 and 2000 the largest and fastest growing age group

was between 55 and 59 years old. During the same 10 year period the age group between 20 and 44 years old has shown a marked decrease. This indicates the population is getting older and the younger generation is moving away. Grant County also displays an aging population. While the average age is lower than Wheeler County (41.7 years old in 2000), this is up from 36.3 years old in 1990. The largest and fastest growing age category is from 45 to 49 years of age – while the population has grown from 1990 to 2000 the age group from 20 to 39 years old has also decreased (Economic Profile System, 2004). Gilliam County shows similar trends as Grant - the median age of 42.8 in the year 2000 is up from 37.4 in 1990, the fastest growing age category is also 45 to 49 years of age, and the age group from 25 to 34 years old has decreased. All three counties demonstrate similar trends; an aging population occurring alongside an out-migration of the younger generation.

In 2000 Gilliam, Grant and Wheeler counties were respectively 96.8, 95.7 and 93.3 percent white (Economic Profile System, 2004). Grant County has had a colorful history associated with Chinese immigrants who came to work in the gold fields of Eastern Oregon. In 1879 these immigrants made up a substantial portion of Grant County's population numbering 2,468 compared to 960 whites; however in 2000 people of Asian descent made up less than 1 percent of the three county populations. People of Hispanic decent have increased in number and percent of total population in Gilliam, Grant and Wheeler Counties between 1990 and 2000 (Table 3-15). The Hispanic population in Morrow County increased by 2,489 between 1990 and 2000, meaning that 74 percent of its population increase was comprised of Hispanic people (Preister *et al.*, 2006). In the year 2000 Native Americans comprised 1.6 percent and 0.8 percent of Grant and Wheeler Counties respectively (Economic Profile System, 2004).

Table 3-15. Number and Percent of Persons of Hispanic Origin

	1990		2000	
	#	%	#	%
Grant	41	0.5	163	2.1
Wheeler	6	0.4	79	5.1
Sherman	10	0.5	94	4.9
Gilliam	7	0.4	35	1.8
Morrow	197	2.6	2,686	24.4

Isolation, Economic Specialization and Employment

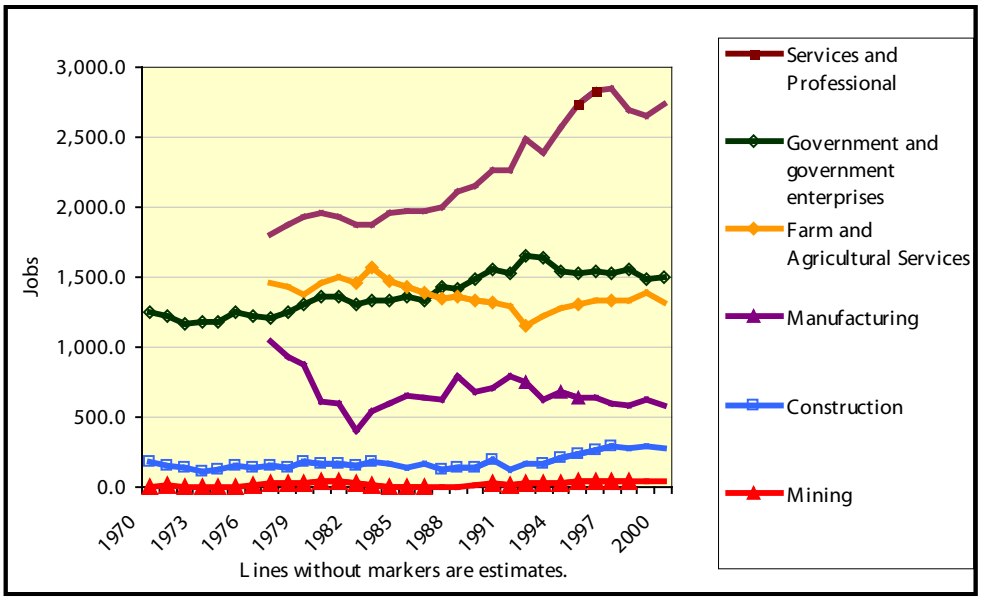
The Interior Columbia Basin Ecosystem Management Project (ICBEMP) also assessed the social and economic conditions of communities within the planning area. They grouped the counties east of the lower John Day River into the Pendleton economic subregion (Gilliam, Wheeler, Grant, Morrow and Umatilla), and the counties west of the lower John Day River (Sherman, Wasco, and Jefferson) into the Redmond/Bend economic subregion. Within these subregions ICBEMP identified communities that were relatively isolated (more than 35-50 miles from a major commercial and population center). This analysis determined that all the communities in the planning area were isolated, or constituted an isolated trade center. Isolated communities with no nearby population centers are more likely to depend on a few major industries (USDA Forest Service, 1998).

Economic specialization was also addressed by ICBEMP. A community was designated specialized if employment in that sector was at least as great as ten percent of total employment for that community. Analysis revealed that Lonerock, Mitchell, Spray, and Monument were specialized with respect to the agricultural sector. Mitchell, Long Creek, Mount Vernon, John Day and Prairie City were specialized with respect to the wood products sector. There were no communities in the planning area specialized with regard to mining or service sectors. Dayville, John Day and Prairie City were all specialized with respect to Federal Government employment. Lastly, Condon was identified as a community specialized in the transportation sector. The degree of economic specialization is reflected in Figure 3-26 below, where total employment in Grant and Wheeler counties is disaggregated into six industry sectors (USDA Forest Service, 1998).

From 1970 to 2004, total employment in Gilliam, Grant and Wheeler counties increased by 19 percent. This increase is dwarfed by the state increase in total employment of 132 percent. The employment growth seen in these counties is largely due to increases between 1977 and 2000 in service and government sector employment; 52 percent and 24 percent respectively. These increases largely offset decreases in manufacturing (including forest

products) and farm related employment which decreased by 45 and 10 percent respectively over the 1977 to 2000 period (Economic Profile System, 2004).

Figure 3-26. Employment History of Grant, Wheeler, and Gilliam Counties



The private sectors examined can be lumped into Goods-Producing sectors (Natural Resources and Mining, Construction, and Manufacturing) and Service-Providing sectors (Trade, Transportation, Utilities, Finance, Education, Health, etc.). Goods-Producing sectors accounted for 31 percent of total employment and on average paid $28,277 per year, while Service-Providing sectors accounted for 69 percent of total employment and paid $22,837 on average in 2005 (Economic Profile System, 2004). From these statistics it is apparent that while the service sector has offset decreases in manufacturing these jobs do not pay as much. The welfare implications of these changes are not so clear. The large degree of out-migration noted above suggests people may be moving out instead of taking lower paying jobs in the service sector.

Economic Well-Being and Poverty

Based on changes in personal income between 1996 and 2005, economic well being appears to have improved in the majority of the planning area except in those counties along the lower John Day River. The percent change in county median income between 1989 and 1999 supports this notion of overall improvements in economic well being except in Grant County where a slight decrease occurred (See Table 3-16).

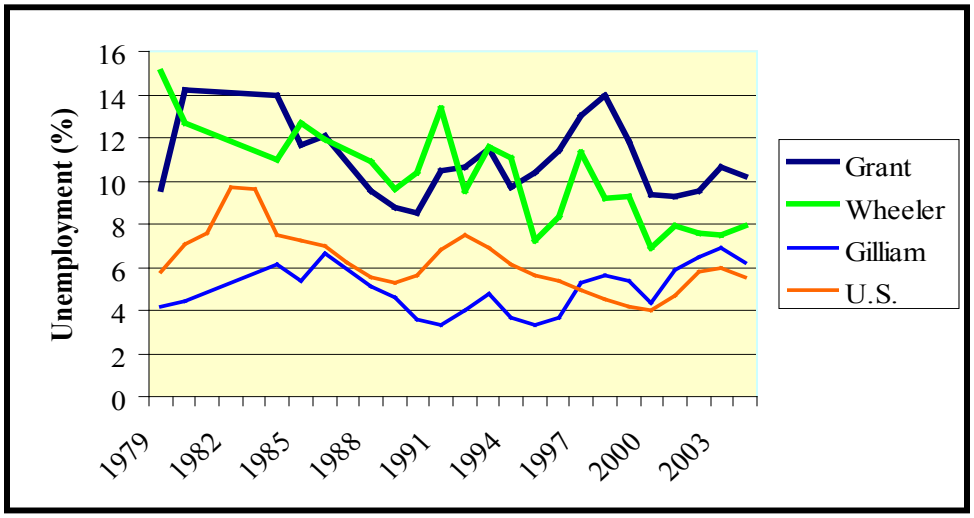
Table 3-16. Change in Income

	Percent change in personal income between 1996 and 2005	Percent change in median household income between 1989 and 1999
Gilliam	-9.0	4.4
Grant	20.0	-1.4
Jefferson	9.5	13.7
Morrow	20.9	16.8
Sherman	-18.5	4.8
Umatilla	12.4	18.7
Wasco	4.8	7.7
Wheeler	37.2	41

Source: BEA and US Census Bureau adjusted for inflation

From 1979 to 2004, unemployment in Grant and Wheeler counties has consistently remained above the national unemployment rate. Grant and Wheeler Counties have experienced average rates of unemployment of 10.5 percent and 9.8 percent respectively. While these two counties are well above the national average of 6.3 percent, Gilliam County has maintained an average rate of unemployment of 4.7 percent, well below the national average (Bureau of Labor Statistics) (see Figure 3-27).

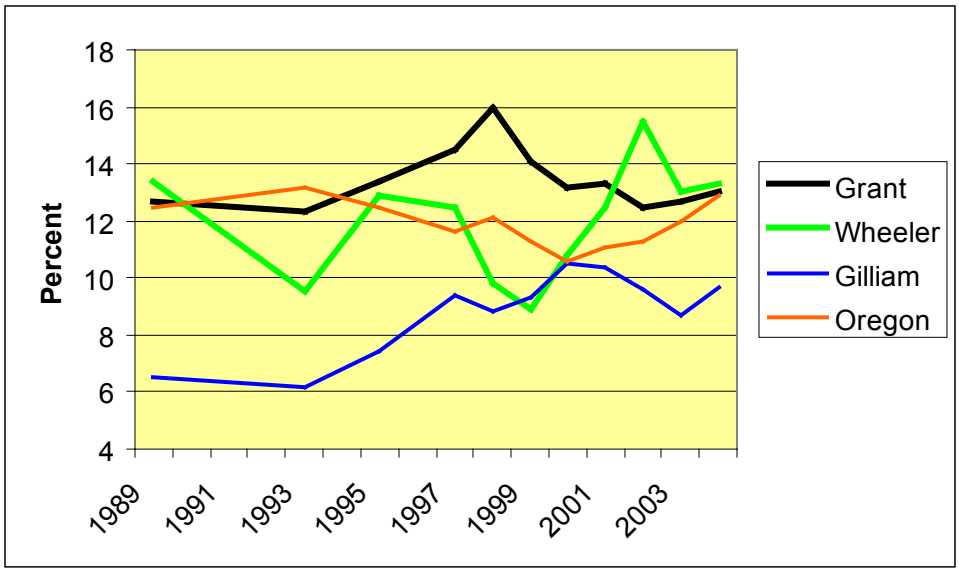
Figure 3-27. Unemployment Rate of John Day Basin Counties



Source: US Census Bureau's City and County Data Book

Grant and Wheeler County residents living below the poverty level remains close to recent levels (see Figure 3-28). Between 1989 and 2004, Wheeler County's average percent below poverty has been the same as the state average of approximately 11.9 percent while Gilliam's population below poverty has remained below the state's average at a level of 8.8 percent (USDC Census Bureau, Small Area Income and Poverty Estimates, 2007).

Figure 3-28. Percent of Population below Poverty level



Components of Personal Income

Further examining trends within personal income provides insight on characteristics of consumers and their connection to the area. There are three major sources of personal income: (1) labor earnings or income from the workplace, (2) investment income, or income received by individuals in the form of rent, dividends, or interest

earnings, and (3) transfer payment income or income received as Social Security, retirement and disability income or Medicare and Medicaid payments.

In Gilliam, Grant and Wheeler Counties, labor earnings are the largest source of income accounting for 53 percent of all income in 2004. This is relatively low in comparison to Oregon as a whole where labor earnings account for 67 percent of personal income. Additionally 25 percent of total personal income is investment income in the three counties. While labor earnings share of personal income has decreased from 1970 to 2004 (from 74 to 54 percent), the share of non-labor income has risen (from 26 to 46 percent). Investment income rose from 16 to 25 percent of total personal income while transfer payments rose from 9 to 22 percent of total personal income. While many might attribute the increase in transfer payments to an increase in welfare, data shows age related transfer payments increased by 7.7 percent while welfare payments increased by only 1.5 percent of total transfer payments (Economic Profile System, 2004).

These patterns may reflect the aging population noted above, whom are more likely to have investment earnings than younger adults. As the population of the area continues to age, the share of income from these non-labor sources should continue to rise as long as residents continue to stay in the area after retirement or new retirees move in. Rural county population change, the development of rural recreation and retirement-destination areas are all related to natural amenities (McGranahan, 1999). Much of the natural amenities in the area are managed by the BLM.

Direct BLM Contributions to Area

BLM land in the planning area contributes to the livelihoods of area residents through subsistence uses as well as through market-based economic production and income generation. Public lands provide products of value to households at no or low cost (permit fees). These products include fuel wood, boughs, Christmas trees, wood posts, livestock, and materials such as sand and gravel. Additional products with subsistence value may include fish, game, plants, berries, and seeds. In addition, use of these products is often part of traditions and sustains local culture.

BLM Expenditures and Employment

BLM operations and management make direct contributions to area economic activity by employing people who reside in the area and by spending dollars on other non-personal needs. Management of BLM lands is largely carried out through a professional and administrative staff which operates in Prineville, while personnel at the John Day Field office and several seasonal staff live and work in the planning area. Expenditures by the Prineville office are largely incurred outside the planning area however many of these expenditures are associated with work in the John Day Basin and occur within the John Day Basin regional economy. Expenditures at this office recently rose to over $16 million (Table 3-17.)

Table 3-17. Prineville District Office Expenditures

Fiscal Year	Personnel	Other	Total	Positions
2002	$8,059,570	$7,004,362	$15,063,932	230
2003	$8,774,382	$5,454,344	$14,228,726	231
2004	$8,956,181	$5,056,678	$14,012,859	241
2005	$9,396,868	$6,874,275	$16,271,144	263
2006	$9,773,623	$6,608,260	$16,381,884	228

The John Day Field Office is located in the town of John Day; providing a direct contribution to the John Day Basin RMP area. Staffing levels and payroll of these BLM employees have been stable over the period from 2002 to 2006. In 2006, the BLM share of total payroll from all federal government employees (Oregon Employment Department, 2006) in Grant and Wheeler counties represented 3.6 percent (See Table 3-18: Salary Expenditures). Recently BLM staffing levels have dropped within the John Day Basin and that trend is expected to continue. In addition to these full time positions several seasonal staff work and live within the basin. Contracts for facilities maintenance, shuttling vehicles and projects contribute directly to the area economy and social stability as well.

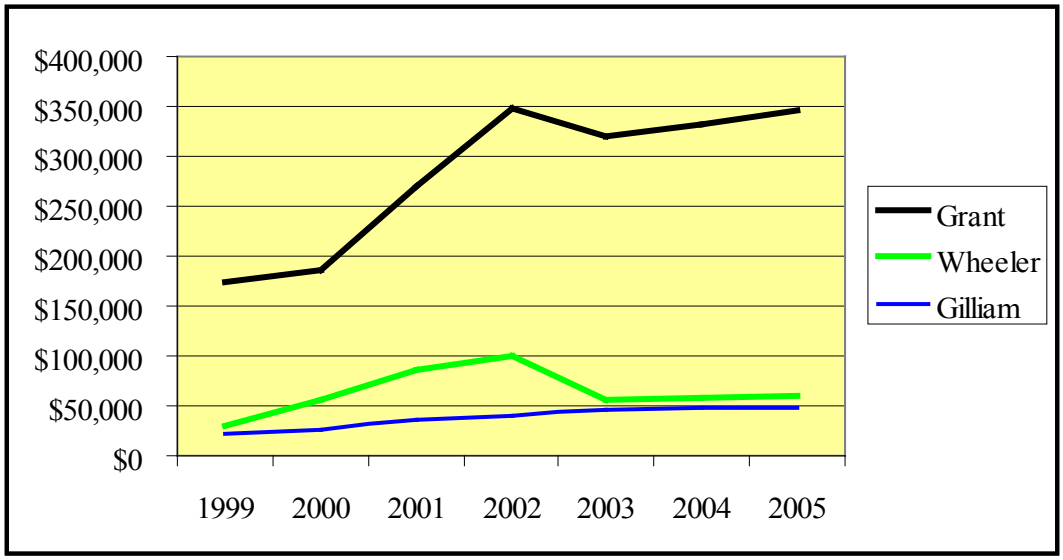
Table 3-18. Salary Expenditures for BLM Personnel Within the Basin

Fiscal Year	Expenditures for Personnel ($)	Positions
2002	314,359	6
2003	310,517	6
2004	310,679	6
2005	434,391	7
2006	478,467	7

Revenue Sharing

In 1976, Congress passed legislation to provide funding to counties through Payments in Lieu of Taxes (PILT) in order to compensate for tax revenues not received from Federal lands. These taxes would typically fund various services that are provided by counties (road maintenance, emergency services, and law enforcement). The PILT payments are determined using a formula which accounts for the county acreage of federal land, county population and the previous year's revenue sharing from resource uses on federal land (timber, range, mining etc.). These PILT payments add to revenues that these counties routinely receive through local property taxes. Figure 3-29 displays previous year's payments. PILT payments to Gilliam County in 2007 totaled $48,275 which was 1.4 percent of the total ad valorem property taxes received for the 2006 to 2007 fiscal year. In Grant County totaled the PILT payment of $351,438 represented 5.8 percent of local ad valorem property taxes, and in Wheeler the PILT payment of $60,562 is 3.5 percent of local ad valorem property taxes (Oregon Department of Revenue, 2007).

Figure 3-29. Payments in Lieu of Taxes



Source: USDI PILT database

In addition mining, timber and range revenues are also shared with counties in the planning area under the 1920 Mineral Lands Leasing Act, 30 US Code Section 603, the Taylor Grazing Act and numerous Oregon state ordinances.

Industries in the area affected by BLM Management

Livestock production

Within the planning area agriculture plays an important economic and social role; area residents identify with the tradition, land-use and history. Of Oregon's 36 counties Grant is the 10th largest cattle producer. The most recent Census of Agriculture (2002) reports Grant, Wheeler and Gilliam counties had 714 farms and ranches (394 in Grant, 164 in Wheeler and 156 in Gilliam) and of these 60 percent (430 operators – 263 in Grant, 102 in Wheeler and 65 in Gilliam) were engaged in cattle production with total cattle numbering 79,143 (45,329 in Grant, 20,533 in Wheeler and 13,281 in Gilliam) in 2002. In 2006 grazing on BLM in the planning area involved 132 operators managing grazing on 231 separate allotments. The season of use on BLM allotments varies from year round, early spring grazing on the river, to complex rotation grazing systems.

Livestock are the largest source of cash receipts by agricultural producers within Grant and Wheeler Counties. In 2002, farms and ranches produced and sold products and commodities totaling $41 million (17,074 in Grant, 6,257 in Wheeler, and 17,370 in Gilliam), with receipts from livestock accounting for 61 percent of this total (24,831 from Grant, 5,637 from Wheeler and 5,178 from Gilliam). Hence the livestock industry is a large portion of the agricultural industry in the planning area (livestock receipts make up 84 percent of total product and commodity sales in Grant and Wheeler counties indicating a larger dependence on livestock than in Gilliam). The nature of the local livestock industry can be characterized by production for sale of calves and feeder steers, along with beef cows or breeding stock. Sheep and lambs are also produced in the area and number 1,317 head and 47 operators, 62 percent of which are located in Grant County (Census of Agriculture, 2002).

AUMs are billed by BLM on an annual basis. The established preference limit for AUMs in the planning area is currently 25,222. This is the maximum number of AUMs that could be offered under ideal forage conditions. However actual use of AUMs has ranged between 12,370 and 24,532 in the last ten years due to factors such as drought, financial limitations on operators, market conditions and implementation of grazing practices to improve range conditions. In 2001 billed AUMs and the preference decreased largely due to implementation of the Oregon Land Exchange Act of 2000. Land previously under BLM management was exchanged for land along the North Fork of the John Day River. While many of the exchanged lands had existing allotments, range allocations were not made on the land acquired pending further assessment under this planning effort (6,320 AUMs were lost due to the Act). While the amount of AUMs offered by BLM decreased, many of these lands were transferred to the adjacent landowner or permittees where the rangeland use was expected to continue under similar management and intensity (USDI BLM, 1998. page 112). However, lands acquired were generally adjacent to BLM parcels with existing livestock use and have not been assigned AUMs.

Between 1998 and 2007 an average of 17,259 AUMs have been billed annually. Table 3-19 provides AUM yearly actual use numbers between 1998 and 2007. The numbers of cows that could be grazed on this average would total about 1,440 head, which was about 1.8 percent of the 2002 Gilliam, Grant, and Wheeler total cattle/calf inventory.

Table 3-19. Annual AUM Authorizations in the Planning Area

Year	Preference	Billed	(percent of preference)
1998	35,908	23,837	76%
1999	35,908	24,532	78%
2000	35,908	24,416	77%
2001	29,558	16,240	64%
2002	29,558	15,116	60%
2003	29,558	13,392	53%
2004	29,558	14,587	58%
2005	29,558	14,105	56%
2006	29,558	13,992	55%
2007	29,558	12,370	49%

Source: BLM Rangeland Accounting System

A thin profit margin often separates livestock producers from negative net earnings. Often, employment outside the ranch augments livestock producer income. Federal grazing land is particularly valuable because of the low grazing fees charged for use of this land. Fees charged by BLM for grazing are calculated using the formula required under BLM grazing regulations found at 43 CFR 4130.81(a)(1) and are considerable less than those charged for private grazing land. In 2006 the statewide average AUM price for private land was $12.5 (USDA National Agricultural Statistical Service, 2007) while the Oregon Department of State Lands charged $5.80 per AUM in 2007. The BLM formula yielded a fee of $1.35 per AUM in 2007 which is down from $1.56 in 2006. This federal land is the least expensive grazing land available, hence use and access is highly coveted by area cattle producers even though additional costs are usually incurred to use these lands.

Agriculture

While Agricultural economy of Grant and Wheeler County is currently dominated by livestock, Gilliam County depends upon farming to a greater degree. The most recent census of agriculture (2002) indicates that 70 percent of total product and commodity sales from farms and ranches in Gilliam County were from crops. Table 3-20 outlines the number of farms and acres of those crops (in parenthesis) for those counties in the planning area. While Gilliam dominates wheat, oats and barley crops Grant and Wheeler grow a larger share of forage crops.

Table 3-20. Number of Farms and Acres of Crops in the Counties of the JDBRMP Planning Area

Crop	Grant	Wheeler	Gilliam
Wheat	1	2	57 (100,433)
Oats	2	2	5 (4,202)
Barley	2	1	12 (5,029)
Forage crops	203 (35,903)	65 (12,260)	24 (3,838)

265,600 acres of crop land in Gilliam, Grant and Wheeler counties were available on public and private land in 1997 (USDA Natural Resources Conservation Service, 1997). BLM specialists estimate there are a total of 250 acres of agricultural land within the planning area which is currently utilized; this amounts to approximately 0.1 percent of this total acreage of available crop land. The BLM agricultural lands are predominantly located in Wheeler County (approximately 200 acres) and make up 1.5 percent of the county's available crop land. Approximately 50 acres of this utilized agricultural land is unauthorized can be classified as agricultural trespass.

Forest Products

In 2006 there were three lumber mills in the planning area, all in Grant County, of which one facility also produced biomass (Ehinger and Associates, 2006). A log home manufacturer also exists in Grant County who depends entirely on wood from the local area. In Wheeler County no mills were present however a log home manufacturing facility and another log furniture manufacturer existed in 2003 (Brandt *et al.*, 2006 pg 25).

Patterns of timber market integration suggest the timber harvested in the area stays in the area. Nearly 100 percent of the timber harvested in Grant County was processed in Grant County. Due to the limited amount of timber processed in Wheeler County, only 1 percent of the timber harvest was processed there. However data indicate that over 90 percent of timber received in the area came from that area (Brandt *et al.*, 2006 pg 19).

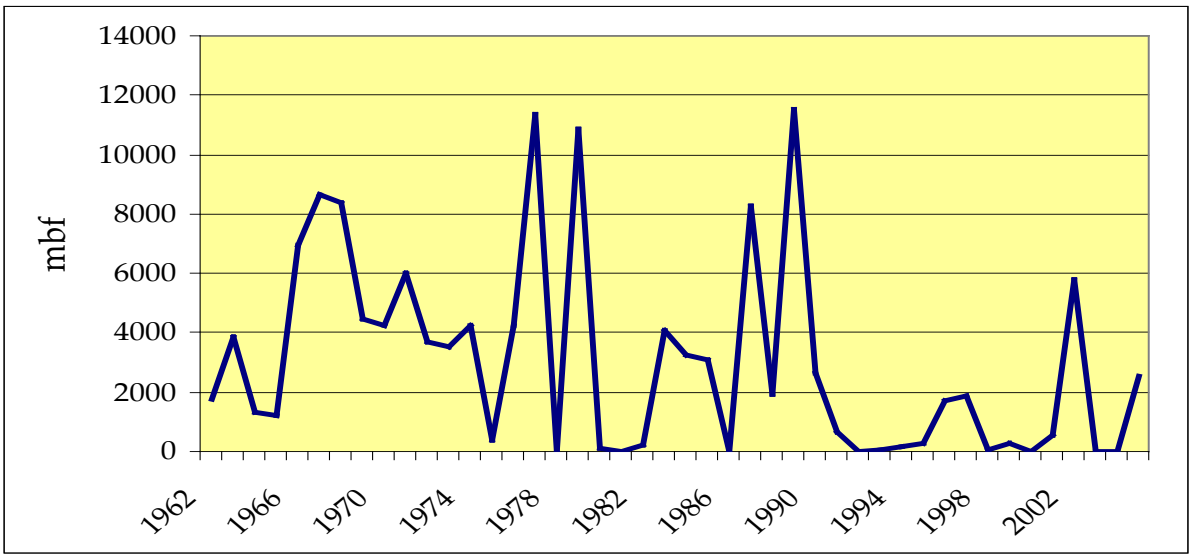
Forestry, Logging and wood products manufacturing accounted for 13 percent of employment in Grant County in 2006. Wheeler county forestry and logging employment data were not disclosed in 2006 while wood products manufacturing employment was zero[1] (Oregon Labor Market Information System, 2007). This suggests Wheeler County is currently less dependent on the forest products industry than Grant County.

Annual harvest data for Grant and Wheeler counties indicate that total harvest have decreased from a high of 426,033 thousand board feet (mbf) in 1974 to just 33,276 mbf in 2005. Much of this decline can be attributed to harvest decreases on national forests in the area.

Gilliam and Sherman counties have had no BLM timber harvest since 1962. Baker County has no BLM land within the planning area so decisions made under this plan will not determine harvests on BLM land in Baker County. The share of BLM timber volume from the total volume harvested (from all ownerships) in the above eight counties has reached 2 percent three times between 1962 and 2005 (in 1966 2.3 percent of total county volume consisted of BLM land, 2.2 percent in 1979, and 3.1 percent in 2002). The mean BLM share over this period was less than 1 percent, with a minimum of zero and a max of 3.1 percent. This evidence suggests that over the last 40 years the role of BLM harvests has been negligible in the counties that contain land within the planning area.

If we limit the geographic scope of interest to just Grant and Wheeler counties the historic role of BLM harvests appears similarly negligible providing slightly above 3 percent of total harvests on seven occasions since 1962. However in 2002 and again in 2005 BLM provided 7.7 and 7.6 percent of total harvests in Grant and Wheeler counties. This trend indicates BLM has provided a greater share of harvested timber recently than it has in the previous 40 years, despite relative decreases in actual levels of harvest from BLM lands (see Figure 3-30).

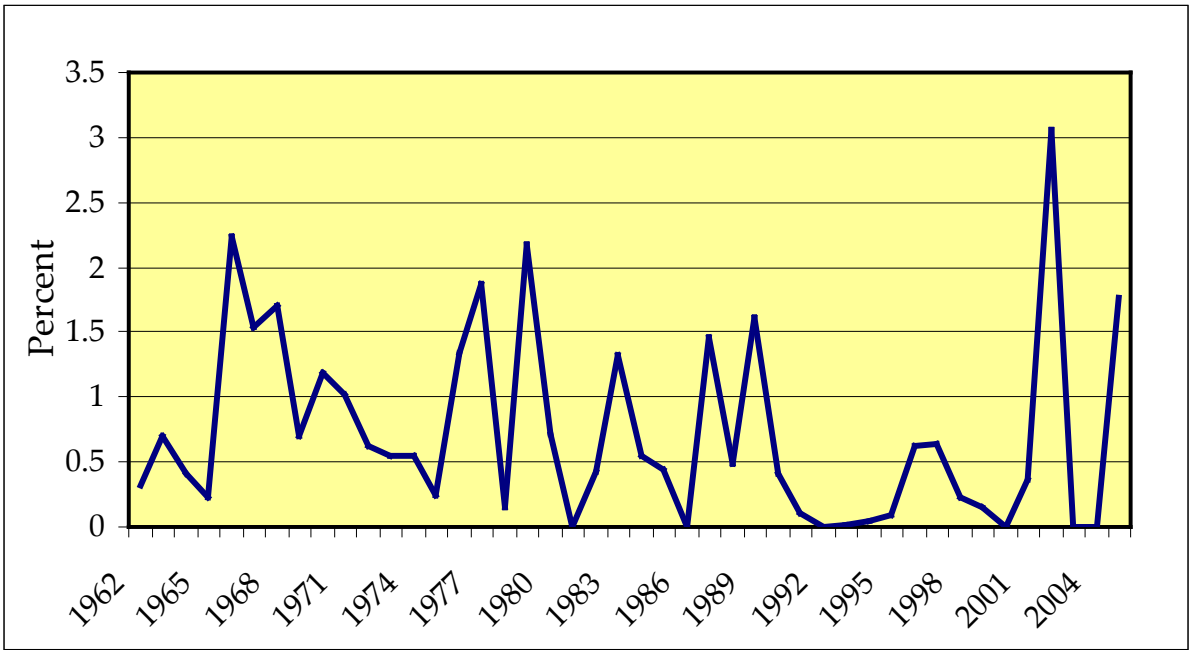
Figure 3-30. BLM Timber Harvest in Grant and Wheeler Counties



[1] Data are often suppressed for counties with few firms in an industry in order to protect proprietary information of those businesses.

Between 1997 and 2005 8,604 mbf of timber was offered in the planning area (JDRMP AMS, 2006 pg 139) while 744,617 mbf was offered from all ownerships within Grant and Wheeler counties. The BLM share of this harvest constitutes less than 1.2 percent of total harvest over this nine year period (See Figure 3-31).

Figure 3-31. BLM Share of Total County Harvest in Eight County Area



Tourism and Recreation

The John Day Basin provides a wide array of recreational opportunities which include boating, hunting, fishing, hiking, camping, sightseeing and paleontological edu-tourism. These activities are enjoyed by area and non-area residents. District office staff estimated there were roughly 96,000 recreational visits to the planning area in 2003. The large expanse of relatively undeveloped lands, unique opportunities on those lands, and the fish and wildlife sustained by habitats on this land attract these visitors. On their way to the planning area and once they arrive these visitors spend money on goods and services they would spend elsewhere if these opportunities did not exist. In this manner the opportunities on BLM contribute directly to the local economy by attracting these visitors.

Since expenditure information by these visitors is not available, National Visitor Use Monitoring (NVUM) data from adjacent national forest will serve as a proxy. Analyses of expenditures reported by national forest visitors show the primary factor determining the amount spent by a visitor was the type of trip taken and not the specific activity or forest visited (Stynes and White; 2006, pg 2). These six trip type segments are defined below;

Visitors who reside greater than 50 miles from visited BLM:

1. Non-local residents on day trips
2. Non-local residents staying overnight on BLM
3. Non-local residents staying overnight off BLM

Visitors who live within 50 miles of the forest visited BLM:

4. Local residents on day trips
5. Local residents staying overnight on BLM
6. Local residents staying overnight off BLM

A seventh category of trip types was not included, non-primary visits, since we are only interested in visitors

who's primary activities are off BLM lands. In accordance with the report prepared for the US Forest Service by the American Sportfishing Association (2006) the data used to divide total visits into these trip types were provided by Stynes and White (2005). An average annual of total visits in the planning area was obtained from BLM's Recreation Management System and extrapolation by district office personnel. An average of the visitation proportions for three national forests adjacent to the planning area (Malheur, Ochoco and Umatilla national forests[2]) was used (Stynes and White, 2005 pg 23-25). Applying these proportions to the national forest visitor spending profiles (Stynes and White, 2005 pg 11, 40) gives the results in Table 3-21.

Table 3-21. Recreation Trip Expenditures

Trip type segment/ spending category	Non wildlife Related Expenditures	Wildlife-Related Expenditures
Non-local residents on day trips	118,802.45	30,690.22
Non-local residents staying overnight on BLM	1,244,243.48	514,861.59
Non-local residents staying overnight off BLM	1,752,229.19	584,733.96
Local residents on day trips	650,855.00	285,641.19
Local residents staying overnight on BLM	583,890.80	233,311.10
Local residents staying overnight off BLM	527,155.27	173,128.54
Totals	4,877,176.20	1,822,366.60

Generalizing from the NVUM data also indicates approximately 25 percent of all visits to the BLM were wildlife related. The largest trip-type segment was non-wildlife related local day trips which numbered 26,545 and the largest spending category was non-wildlife/non-local overnight visitors staying off BLM lands.

Mining

Although mining has played a significant role historically and culturally, employment quickly decreased following the boom of the mid 1800s. From 1969 to 2000, mining as a share of total employment has not exceeded 1.5 percent in all 9 study area counties, where data are available. In 2004 Mining made up 1 percent of total employment in Gilliam, 0.3 percent in Grant County and reported no jobs for Wheeler County (EPS, 2004). The 2005 average wage for the natural resource and mining sector in Oregon was $25,303 compared to an average state wage of $36,226. In Grant County the 2005 annual wage for the natural resources and mining sector was $27,583, $20,210 in Wheeler County and unavailable in Gilliam County. While one might assume mining provides little economic value in terms of employment and income, its social value is evident from continued recreational mining and value placed on its historical importance.

Wind

Wind generation has become a part of the local economy of the lower John Day river counties. The landscape has always been subject to the driving winds of the Columbia River Canyon which are now being harnessed by wind farms. Local businesses and counties are benefiting from the influx of resources and tax revenue from these projects. However it remains to be seen whether BLM land can contribute to the planning area economy and community well-being through provision of energy leases, or whether its greater contribution might be providing open spaces free of windmills.

Small Community/Cooperative Projects sell power through Power Purchase Agreements with regulated utilities. These projects are attractive because they can become community revenue generators, involve schools and local interests, and help supplement future power growth. Large Commercial Projects are sited in areas of strong winds, transmission access, and market demand.

As of August 31, 2007 installed wind power capacity in Oregon reached 497 MW of power. This is up from 25 MW in 1999 (US DOE, 1997). Four wind projects are under construction in the area as well; one in Union county (140 MW capacity), 2 in Sherman County (totaling 347 MW) and another near the town of Boardman (15 MW).

[2] With only a small area of adjacent land and spending characteristics of visitors that are inconsistent with visitors to the planning area (Phelps 2006c), Wallowa-Whitman National Forest was not included.

Niche Market Opportunities

> "Some people close to it here estimate that we could get in 50,000 visitors annually for paleo activities. There are partnerships to be had here, if we could just get our act together." [Wheeler County] 1

It also has been suggested that "those rural areas that are prepared to evaluate the offering of nontraditional goods and services are the most likely to prosper" (Castle 1991:53). Castle notes that "this does not mean that the traditional [extractive] industries will be abandoned" (1991:53), but it does suggest that a willingness to take chances and try new things is an important strategy for rural communities faced with change.

According to community fieldwork undertaken under contract by JKA, County and local leadership has been active in fostering efforts at economic diversification within the planning area. Citizens and officials are interested in fostering a diverse economy and niche markets are emerging in specialty beef, eco-tourism and small non-industrial businesses.

In Wheeler county ranching and recreational niche markets are developing fostering needed economic development. These include the Painted Hills Premium beef and the development of paleontological resources such as the citizen digs behind the high school and the Paleo Project. A steel fabrication company recently opened in Spray as well.

Local economic development efforts in Grant County have focused on supporting and strengthening existing businesses, and the promotion of outdoor recreation. The growth of bed and breakfast establishments and specialty crafts companies may indicate a trend of developing market niches (Preister, 2006). Prairie City has two small wood products companies that focus on post and pole and juniper operations and a juniper/pine decorative furniture shop which sells "all the furniture we can make", much of it through catalog sales (Preister, 2006). Strawberry Mountain Natural Beef opened for business in John Day in 2005, and currently comprises 12 ranchers from the John Day area. In addition, a bowstring manufacturing facility exists in Grant County's new airport industrial park.

Other emerging niche markets opportunities include wind energy development in Sherman County and the OHV Park in Morrow County.

Non-market economic value

The value of resource goods traded in a market can be directly elicited from information on the quantity sold and market price. Since markets do not exist for some resources, recreational opportunities and environmental services, the elicitation of value is important since without these value estimates, these resources may be implicitly undervalued and decisions regarding their use may not accurately reflect their true value to society. These resources, recreational and environmental values not traded in markets can be characterized as non-market values.

Non-market values can be broken down into two categories; use and non-use values. The use-value of a non-market good is the value to society from the direct use of the asset. In the John Day Basin this occurs as recreational fishing, hunting, boating and bird watching. The use of non-market goods often requires consumption of complementary market goods; such as lodging, gas, and fishing equipment.

Non-use values of a non-market good reflect the value of an asset beyond any use. These can be described as existence, option and bequest values. Existence values are the amount society is willing to pay to guarantee that an asset simply exists. Existence values in the John Day Basin might be the value of knowing that a native steelhead fishery exists. Other non-use values are thought to originate in society's willingness to pay to preserve the option for future use; these are referred to as option values and bequest values. Option values exist for something that has not yet been discovered; such as the future value of a plant as medicine. In the John Day Basin bequest and option values might exist for timber or numerous plant species.

Non-market use and non-use values can be distinguished by the methods used to estimate them. Use values

are often estimated using revealed preference methods or stated preference methods while non-use values can only be estimated using hypothetical methods. While use and non-use values exist for the John Day Basin, evaluation may not be feasible during this RMP process. However this does not preclude their consideration in the planning process.

Community Well-Being

Questions about whether the flow or resources ensures stability of community life, such as population and social structure, have emerged. This is partially due to technological advances reducing demand for labor and concern of how well people live rather than what people do for a living. The concept of resource dependence has expanded beyond just economic ties based on resource outputs to noneconomic connections that include recreation, amenity values and cultural traditions (GTR – 693, pp 4-5 2006).

Well-being has been distinguished on the basis of capabilities and achievements of individuals and on the social, cultural, and psychological needs of people and communities. However no definitive conceptual definition of community well-being exists (Donaghue, E.M. *et al.*, 2006, pp 6 and 15). Indicators used by Donoghue, Sutton and Haynes in their report on BLM forest management planning in Western Oregon include the diversity of employment by industry[3], education (share of population, 25 years and older, with a bachelor's degree or higher), unemployment rate, percent of population below the poverty line, median household income and travel time to work in minutes. Table 3-22 summarizes the values of these indicators by County and for the entire state of Oregon

Table 3-22. Community Well-being

Indicators of community well-being	Gilliam	Grant	Wheeler	Oregon
Employment Diversity (2004)*	0.5323	0.5809	0.4998	0.742
Education (2000) (years)	13.4	15.7	14.4	25.1
Household income (2004) (dollars)	$41,993	$34,475	$29,390	$42,568
Unemployment (2004) (%)	6.2%	10.2%	7.9%	7.3%
Percent below poverty level (2004)	9.7	13	13.3	12.9
Mean travel time to work (2000) (minutes)	18.1	18.7	30.8	22.2

Source: US Census Bureau and *IMPLAN

Indicators in Gilliam, Grant and Wheeler counties positively associated with community well-being (Employment Diversity, Education and Household Income) were below the state numbers. Indicators negatively associated with community well-being (unemployment, poverty, and mean travel time to work) were above the state numbers for Wheeler County and Grant except for travel time to work was less than the state average. In Gilliam County, the indicators negatively associated were below the state numbers possibly indicating a higher level of community well-being than Grant and Wheeler. Overall, these numbers suggest community well being in the planning area may be lower than the state as a whole.

Resiliency

Community resilience can be described as the existence, development and engagement of community resources to thrive in a dynamic environment characterized by change, uncertainty, unpredictability and surprise. Resilient communities intentionally develop personal and collective capacity to respond to and influence change, to sustain and renew the community and to develop new trajectories for the communities' future (Magis, 2007 pg 4).

Community resources or assets, when invested, become community capital which the community can then reinvest in a continual cycle of community development. These are not limited to financial investments but also include time, energy, action and cooperation. Using the community capital framework enables the identification

[3] The Shannon-Weaver employment diversity index is determined by the number of industries there are in the region and how well-distributed employment is throughout all of those industries. Its values range from zero to one, with one being perfect diversity. As employment and output become concentrated in fewer industries, the index approaches zero.

of the entire range of community assets. It further, provides a systematic, comprehensive structure with which to analyze the existence, interactions, change and development of community resources (Flora *et al.* 2004). These capitals are listed below

- Natural Capital—Air, soils, water (quality and quantity), landscape and biodiversity.
- Cultural Capital—Language, rituals, ethnicity, generations, stories and traditions, spirituality, habits, and heritage.
- Human Capital—All the skills and abilities of people, self-esteem, education, leadership, knowledge, the ability to access resources and human health.
- Social Capital—Groups, organizations, networks in the community, the sense of belonging, bonds between people, trust and reciprocity.
- Political Capital—connections to people in power, access to resources, leverage, and influence to achieve goals.
- Financial Capital—Money, charitable giving, grants, access to funding and wealth.
- Built Capital—buildings and infrastructure in a community, schools, roads, water and sewer systems, and main streets.

Harris *et al.* (2000) conducted an assessment of communities in the upper Columbia River basin for the Interior Columbia Basin Ecosystem Management Project (ICBEMP). The project assessed community resilience using a measure termed the "community resilience index" (CRI) to indicate a likely response to change. The index was based on community characteristics critical to a town's capacity to adapt to future changes, including strong civic leadership, a highly cohesive social organization, local amenities and attractiveness, and a diversified or stable economy (Harris *et al.*, 2000 pg 84). These elements have similar character and commonalities to those used by Flora *et al.* (2004) listed above. CRI scores for communities within the basin are listed in the Table 3-23 and give an indication of the baseline resilience of the planning area.

Table 3-23. Levels of Community Resilience for Columbia Basin Study Communities, With Levels of Scores on Scales Comprising the Community Resilience Index (2000)

County	Levels of scores on community resilience index	Levels of scores comprising community resilience index (listed in order of weighted importance)			
		Civic Leadership	Social Cohesion	Economic Structure	Physical Amenities
Gilliam					
Antelope	Low	Low	Low	Low	Low
Arlington	Med. Low	Med. low	Low	Med. low	Low
Grant					
Dayville	Low	Low	Med. high	Low	Low
John Day	High	Med. high	Med. High	Med. High	Med. High
Long Creek	Low	Med. High	Low	Low	Low
Prairie City	Med. Low	Low	Med. High	Med. High	Med. High
Sherman					
Grass Valley	Med. High	Med. High	High	Med. Low	Med. Low
Wheeler					
Spray	Low	Low	Med. Low	Low	Low

Source: Harris *et al.* 2000

Communities living and interested in the John Day Basin

Communities within the John Day Basin can be described by the areas they live in or by their shared connection

to the local landscape. During the resource management planning process the public has given the BLM insightful information on their connections to the land and their interests in BLM management. In addition BLM contracted with a team of social scientists to gain further detail through intensive interviews and community fieldwork (Preister, 2006). How a community is defined, and where they network is often inter-related to the management of BLM lands.

In the case of analyzing the effects of Federal land management actions, the most critical impacts may be to small, rural communities (Harris *et al*. 2000, pg 5). Consequently, geographically defined communities are important and relevant level for social assessment. Not all social scientists agree, however, that the geographically based community is always the appropriate level of analysis. FEMAT (1993, pg VII-35) makes the point that this view "only refers to physical or political boundaries and not to the relationships among people who reside within such boundaries."

Communities of interest bring together stakeholders from different backgrounds to solve a problem of common concern (Fischer, 2001, pg 4). Brown and Duguid describe communities of interest as "communities-of-communities" (Brown and Duguid, 1991 pg 53). They provide unique opportunities to explore the linkages between people and public land.

While communities of interest often form temporarily, the issues that bring them together in the John Day Basin often present no immediate resolution. While BLM may resolve or enhance their interests, many require involvement outside the scope of BLM management or the formation of networks to bring them together. These networks provide a structure for individuals to form communities of interest and address concerns with the links between communities and BLM.

Networks

Common networks in the North Fork John Day area include the Monument Soil and Water Conservation District, the North Fork John Day Watershed Council, Boyer Market, Monument Café, and the public schools. Other networks within Grant County include the Dayville Mercantile, churches, a theatre group called the South Fork Players, and area schools.

Within Wheeler County schools provide network cohesion along with cafés and restaurants. Oregon Paleo Lands Institute and OMSI's Hancock station provide organized trips, workshops and events that connect people with the local landscape. The local search and rescue and the soil and watershed conservation district also provide organizational structure for communities of interest.

Along the lower John Day River, area schools are the center of activity for many residents. The Agriculture Marketing Club, hosted by Sandy Macnab and the Mid Columbia Producers grain growers association provide a mobilizing force for different communities of interest. Additionally the Café Moro, the Lean-to Restaurant/Goose Pit Saloon and the Sherman county Historic Society also provide a place for exchange of information.

Ranchers

In the late 19th and early 20th centuries the first stockmen and homesteaders arrived in the area. While ranching preceded farming it still plays a role in the local economy and residents find connection to the land through this tradition.

Ranchers are interested in mutual aid for fire safety and suppression, access to isolated parcels of BLM, land sale, grazing, fee hunting, cooperative projects and contact with BLM, and noxious weeds issues such as the inability to treat weeds in floodplain and WSA.

In addition, ranchers are concerned with grazing on the North fork as it pertains to fence maintenance, gate vandalism, OHV use, noxious weeds and access. Grazing in the North Fork, Sutton Mountain and throughout the planning area is a traditional land use valued culturally. Ranching has played a historic role in the community and many ranchers and area residents would like to see this traditional use continue.

Individuals and groups who give a high priority to resource protection

Fish, wildlife, riparian/upland health, soils, scenery and other resource values in the John Day Basin are a priority to many individuals and groups. Control of noxious weeds, maintenance of healthy fire ecosystems and other criteria were often suggested as means to achieve healthy ecosystems. Land use designations were often suggested as a means to maintain or enhance these values. Other comments suggested the designation of the North Fork John Day River as a wild and scenic river (WSR) segment would result in additional use and consequent resource damage as a result of being "loved to death". Many of these individuals also believe the direction provided in the Oregon Land Exchange Act provides sufficient direction to protect resource values while others believe WSR designation would further protect these resource values. This community of interest also advocates limiting grazing, motorized use, and chemical use in WSRs. This community sees limits on motorized use, mineral withdrawal, and grazing as effective tools to protect resources. Many individuals and groups uniquely identify with mid-Columbia River steelhead, elk, deer, wild horses and the protection of their habitat. A strong interest in protecting resources for future generations was also often expressed.

Many of these individuals believe the forgone economic benefits from resource use are realized as improved resources attract visitors and thus provide service based economic benefits the area. Local citizens are aware of how the unique nature of the local area contributes to their current and future social and economic well being.

Individuals and groups who give a high priority to resource use

Within this community people believe that the traditional industry sectors of timber production and agriculture are steady or declining. Even though these sectors remain important culturally and politically, the sense is that economically, the writing is on the wall. People expressed high degrees of uncertainty about the future of local woods products manufacturing. In addition, ranching is a highly valued way of life but ranchers and townspeople noted that ranches require second jobs.

Many of these groups and individuals expressed a concern with restrictions on uses without adequate rationale about consequent resource damage. Others maintained access was important to continue commercial uses of public and private lands their livelihoods depend upon. For example Oregon Department of Transportation would like mineral material available for future road maintenance.

Recreationists

Recreationists have traditionally used the area for hunting, fishing, camping, hiking, boating, photography, sightseeing, wildlife viewing, recreational mining and OHV use. The wilderness like character, solitude, and scenery appeals to many users of the planning area, especially the newly acquired lands along the North Fork John Day River.

Many believe designation as a wild and scenic river would threaten this unique recreation experience by encouraging more use. Others believe the WSR designation would limit motorized use and thus enhance the wild and scenic recreation value. Some would like additional campgrounds along the North Fork while others desire an experience without facilities believing they would attract users and degrade the desired experience. Grazing and timber harvest are believed to degrade the recreation experience by some recreationists.

While motorized use is of interest in the area, especially during hunting season, the public often sees a need to limit use to designated routes in order to protect resources and the desired recreational experience. However, concern exists that OHV access will be too limited and may impede a tradition of dispersed use commonly used by many types of recreationists. Many recreationists wanted better communication infrastructure within the river canyon and wondered about uses allowed within Wilderness Study Areas.

Area residents

Area residents cannot be characterized by one socio-demographic group. There are individuals and groups who have lived in the area for multiple generations and identify strongly with cultural traditions specific to the area. Other residents have moved to the area more recently and are tied to the landscape in different ways. They often value these same cultural traditions but often came for different reasons. As residents their connection to BLM unifies them with a group of common interests.

One of the most widespread interests specific to area residents includes impacts to private property. The effects of BLM management on property values and private property rights were commonly expressed; for example water rights, the ability to construct adjacent to WSR corridors and changes to access of private lands with transportation planning.

The impacts from increased use on BLM land were a quality of life concern for area residents. Fire protection, noxious weed invasion, vandalism, trash disposal, OHV noise, and trespass were sources of apprehension. Increased costs from these changes such as fence maintenance and the need to now limit access historically allowed because of damage to private property was a concern.

These residents advocated for multiple use of public land with stipulations on OHVs and other uses to maintain public safety and avoid resource damage. A strong desire to work with BLM to find solutions to these common problems was expressed, such as coordinating fire treatments, obtaining easements for public access, and helping to provide public education on resource condition. Area residents also stated a desire for economic opportunity such as jobs for area youth and possible land ownership adjustments to improve quality of life.

Individuals and groups interested in access

Access across private land to BLM parcels and across BLM to private land for recreation, commercial or cultural uses involves many different types of communities. While access for specific communities of interest has been noted, there are individuals and groups with access concerns that are not of interest within other communities.

The Preister report (2006) noted that connections between access and community cohesion was of significant interest with the concept of "neighboring." When new landowners cut off access across their lands to public lands traditionally used by locals, community bonds are affected. James Kent and Associates suggest that "if the land use plan developed by BLM could be done in a way to re-invigorate the value of neighboring in the community, a long-term benefit will be realized."

Keeping access equitable was a point frequently made; for example if access to hunting can only be provided across private lands, increasingly regulated by fees, the working class may be less able to access public lands beyond.

The ability of the elderly and the disabled to access an area given various limitations on motorized use (such as WSR designation) is important to the public. Interest in trail maps was also commonly expressed, as was a desire for continued access to culturally important areas. People often expressed interest in the future of access with a navigability determination along stretches of the John Day River.

OHVers

The use of OHVs in the planning area cannot be ascribed to only one type of user. There are some opportunities in the planning area that provide for concentrated use where OHVers can pit their skills and machines against challenging terrain. The landscape also provides opportunities for dispersed use of OHVs for recreation, cultural and commercial uses. Individuals and families enjoy OHV use on and off trail in order to view scenery and explore. Others utilize OHVs for hunting, tend cattle or collect antlers. These dispersed uses can be contrasted with the concentrated use common in play areas. Trails may develop from dispersed use leading to concentrated use however the desired experience is quite different between these OHV groups (motorcycle, ATV and four-wheel drive users).

As a community they are both interested in maintenance of their lifestyle opportunities within the planning area. Avoiding resource damage is often expressed. The need for limitations on use was expressed when resource damage was apparent. Little support exists for closures where no resource damage can be proven.

Individuals and Groups interested in less government regulation

Some area residents and users of public lands are interested in maintaining cultural uses uninhibited by further or existing government regulation. They see restrictions to limit use as unnecessary or a personal affront to their ways of life. Motorized use restrictions, special area designations, road closures, and limits on commercial uses are a few examples. They often see special area designations as redundant bureaucratic steps limiting

management options. This community advocates for more local control and believes payment/permit systems unduly isolate segments of the population.

Niche Market Opportunists

Significant interest abounds within the basin to capture a comparative advantage from amenities within the planning area. The unique natural history creates tourism opportunities many locals see as potential for business ventures. Paleontological, voluntourism, natural history interpretation, boating, and hunting/fishing guiding are just a few of the opportunities provided by the local landscape. In 2001 Wheeler County launched the "Paleo Project" as its lead economic strategy which encompasses program and facility development and the enhancement of the region's natural and cultural resources. Additionally, all the counties containing BLM land within the planning area have formed a partnership to promote tourism opportunities unique to the area called "Oregon's Rugged Country" (State of Oregon, 2007).

The landscape also attracts an influx of hunters and fishermen to the area in seek of game birds, elk, deer and fish. Bowhunting for deer and elk has increased significantly in the last few years which may have some relation to the recent start of a bowstring manufacturer in the John Day airport industrial park. Other opportunists see potential to benefit landscape health by utilizing juniper removed during vegetative treatments from public and private land. These trees are currently utilized for furniture, crafts, occasionally biomass and building material. The natural beef niche market is growing quickly. Painted Hills Natural Beef started in the mid 90s in Wheeler County and Strawberry Mountain Natural Beef started in 2005 in John Day. Wind energy in the lower John Day region is growing quickly as renewable energy becomes more viable and sought after source of energy. Solitude, scenery and the sense of wide open space that comes from the unique area landscape provides a sense of adventure from the undeveloped landscape.

Opportunities for niche markets are of high interest. Whether this is Painted Hills Beef or opportunities associated with paleontology, people identify with these landscape characteristics and traditions and seek opportunities to accentuate them in new businesses.

Native American Trust Responsibilities

Members of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and the Confederated Tribes of Warm Springs Reservation of Oregon (CTWSRO) exercise rights to hunt, fish, and gather on lands ceded to the Federal government within the planning area. Much of the planning area is within the ceded lands of the CTWSRO. The CTUIR have limited ceded lands but strong interest in the planning area. The Burns Paiute have traditionally occupied portions of the upper John Day country. The Confederated Tribes and Bands of the Yakama Nation have also expressed interest in the planning area. The Yakama are known to have used the area for hunting, fishing, gathering, or to attend social events.

Since the BLM manages portions of the ceded lands that are within the traditional use areas of the tribe, the BLM has a trust responsibility to provide the conditions necessary for Indian tribal members to satisfy their treaty rights. The BLM also acknowledges a responsibility to consider the interests of tribes that are known to have used BLM managed lands.

Currently, Native American tribes are not dependent on commodity resources from lands managed by the Prineville Field Office for their economic livelihood. However, they do use BLM public lands resources for subsistence and cultural purposes.

Environmental Justice

Environmental justice refers to the fair treatment and meaningful involvement of people of all races, cultures and incomes with respect to the development, implementation and enforcement of environmental laws, regulations, programs, and policies. Executive Order 12898 requires Federal agencies to "identify and address the… disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

Under BLM Instruction Memorandum No. 2002-164, "environmental justice populations" can be identified when county populations meet either of the following criteria:

- 1 At least one-half of the population is of minority or low-income status.
- 1 The percentage of population of minority or low-income status is at least ten percentage points higher than for the entire State of Oregon.

Census bureau statistics (Figures 3-32 and 3-33) suggest that neither Grant nor Wheeler Counties have populations that meet either environmental justice population criterion. However several other counties contained partially within the planning area have environmental justice populations (Jefferson and Morrow Counties) defined by the above criterion. The proportions of these counties that fall within the planning area are quite small and are often made up of entirely public land (Morrow County) or contain no towns, cities or concentrated areas of residence (Jefferson County). Thus while these counties contain "environmental justice populations" it is unlikely that highly localized minority or low-income populations exist within the JDBRMP planning area.

Figure 3-32. Percent of County Population by Reported Race (2004)

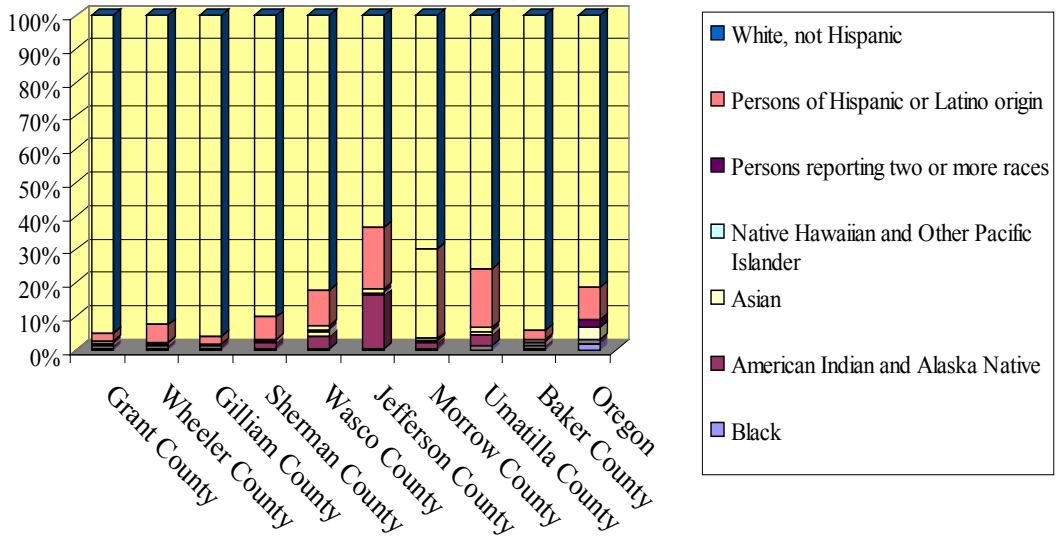
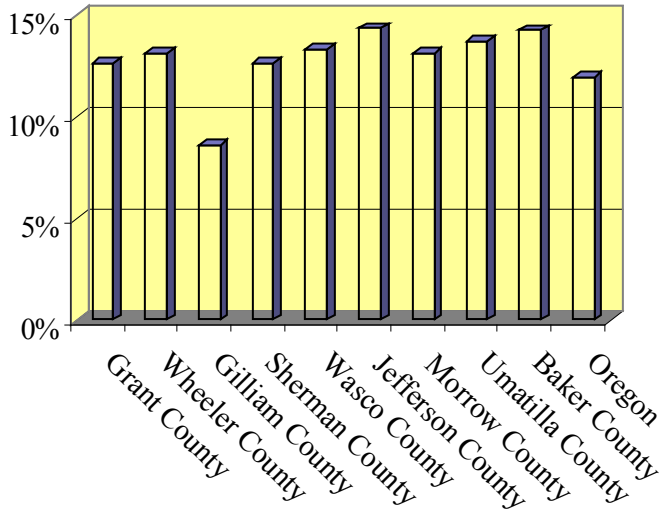


Figure 3-33. Percent of County Population below Poverty Level



From Figure 3-33 above, no clear trends in poverty rates are apparent. While changes in employment from natural resource sectors to the recreation and services sectors are evident, there is no evidence that increases in poverty

will result. While poverty rates are higher in Grant and Wheeler counties than the rest of the state, they are not extremely so, nor any higher than other rural counties in the region.

Resource Uses

Native American Uses

American Indian uses involve a range of traditional economic, social, and religious practices performed by indigenous tribal groups on public lands. There are many facets to these uses. They can range from the protection of past burial sites to concerns about availability and access to root gathering areas to the quality of water that contributes to anadromous fish runs. The BLM has legal responsibility under treaty authority, federal law, and formal agreements with tribes to make a good faith effort to consult with and consider tribal concerns and interests when planning land use actions.

The distribution of these uses is not easily defined or well known. Many tribal members do not divulge this information either within a tribe or with agencies. The information the BLM does receive from tribes about use areas is withheld from the public as a condition of the special relationship between the tribes and the agency.

Adverse impacts to American Indian traditional use sites include alteration of sites and site settings, loss of vehicular access to sites, land tenure adjustments, and noise and visual intrusions to site setting. Disturbance or destruction of spiritual sites occurs when physical elements such as cairns, mounds or burials are damaged or removed. Adverse impacts to traditional use resources include reduction or elimination of resources such as various roots, berries, fish and other resources. Activities that result in the removal of competing vegetation, such as fuel reduction, could provide a beneficial impact through increased growth of traditional use plants. Likewise, land tenure adjustments can provide a beneficial impact by eliminating inaccessible tracts of lands and acquiring lands that are more accessible.

Management actions that could affect traditional use sites and resources include any that would result in ground disturbance, alterations of plant communities, loss of key landforms or settings, and access restrictions. The actions include timber harvest, road construction and road decommissioning, fire and fuels management, noxious weed eradication, permits for commercial and non-commercial uses of special forest products, land sales and land exchanges, and off-highway vehicle management. Making a good faith effort to consult with recognized tribal governments and tribal members early in project planning to identify locations and resources of concern would reduce or eliminate most effects to sites and resources of interest to recognized tribes. The BLM maintains agreements with most of the recognized tribes that have an interest in the planning area, specifically the Confederated Tribes of the Warm Springs Reservation, the Confederated Tribes of the Umatilla Indian Reservation and the Burns Paiute Tribe.

Livestock Grazing

Grazing is one of the most visible and established uses of BLM managed lands. The public lands are an integral part of ranching in the area because of their scattered distribution and ability to provide forage during a critical time of the year. There are many ranches with several hundred acres of public grazing land scattered throughout. Generally these lands are best managed with the adjacent private lands since it is not practical to fence them separately. The larger blocks of several thousand acres are easily managed separately from private lands. These blocks of BLM managed lands are generally located at elevations where they provide excellent forage from early spring to early summer. This is an important transition period as livestock move from winter feeding areas to summer ranges. It also has utility as livestock return in the fall.

Livestock grazing is authorized on 432,600 acres or 95 percent of public land managed by the BLM in the planning area. Because BLM lands in the John Day Basin consisted of mostly scattered tracks these lands were not included in a grazing district and are managed under Section 15 of the Taylor Grazing Act.

Under Section 15 of the Taylor Grazing Act BLM lands within the planning area are leased for grazing on an animal unit month (AUM) basis. An AUM is the amount of forage a cow and calf consume in one month. The number of AUMs available was determined by range surveys completed between 1967 and 1974 in the John Day River basin. These surveys established the grazing use levels that continue to be authorized today.

There are 229 grazing allotments which vary in size from 22 acres of public land to over 25,000 (See Map 10 in Chapter 2). Since the distribution of public land is generally scattered, the number of acres in any one allotment tends to be small. The majority of allotments, 63 percent of the total, contain less than 1,000 acres of public land. Information specific to each allotment is shown in Appendix J. The total number of active AUMs is 28,500. As with the acreages, the number of AUMs per allotment is generally small; 71 percent or 163 allotments contain 100 or less AUMs. Fifty allotments contain 10 or less AUMs.

Allotments in the North Fork John Day area affected by Congressional language in the Oregon Land Exchange Act of 2000 (OLEA) are highlighted in Appendix J. Pre-OLEA public lands are intermingled with North Fork John Day acquired lands and as a consequence cannot reasonably be managed differently than the acquired lands. The result is that, following the guidance of Congress to manage the North Fork John Day acquired lands for the benefit of fish, wildlife, and recreation, grazing is not now permitted on the pre-OLEA public lands. One allotment in this area (North Fork #4029) contained North Fork John Day acquired lands but was left available for grazing since the acquired lands made up only 12 percent of the total, and the allotment had a high percentage (60 percent) of private land. Though this allotment is "open" it has been inactive since 2001.

The BLM Prineville District completed an Ecological Site Inventory of the public lands in the lower John Day River basin in 1982. This inventory identified ecological sites, delineated geographical areas across the basin on the basis of these ecological sites, and assessed the ecological condition of the geographical areas with respect to what was believed to be their potential.

In 1997, the Oregon/Washington BLM adopted the Standards for Rangeland Health and Guidelines for Grazing Management (USDI BLM, 1997), and incorporated the "Rangeland Standards & Guidelines" into existing plans. The Standards meet the intent of 43 CFR 4180 (rangeland health regulations), which contain the objectives to "…promote healthy sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions…and to provide for the sustainability of the western livestock industry and communities that are dependent upon healthy, productive public rangelands." The Standards are the basis for assessing and monitoring rangeland conditions and trend. The assessments evaluate the standards and are conducted by an interdisciplinary team with participation from permittees and other interested parties. Based on 43 CFR 4180, if livestock are a significant causal factor in failure to meet a Standard, as soon as practical but not later than the start of the next grazing season, management will be implemented to ensure that progress is being made toward attainment of the standard(s).

Rangeland Standards & Guidelines assessments have been completed on 99 allotments (close to half of the total) in the planning area. Out of the ones completed, 40 percent are meeting all standards and 60 percent are failing one standard or more. Of allotments that are failing, only 14 (23 percent) have livestock as a causal factor and 46 (77 percent) have some other factor(s) contributing to the failure. The main reasons for allotments not meeting standards, where livestock are not the cause, are increasing juniper stands, noxious weed infestations, and water quality. Overall it appears livestock are a primary contributor in a minority of the grazing allotments not meeting the Standards for Rangeland Health. Actions to address failure to meet a Standard can include change in season of use, forage allocation levels, grazing intensity, or discontinuation of grazing in all or a portion of the allotment.

Most grazing allotments in the planning area have been assigned to a management priority category so management efforts and funding can be directed to areas of greatest need. These categories are "Improve" (I), "Maintain" (M) or "Custodial" (C). The I allotments are usually areas with a potential for resource improvement where the BLM controls enough land to implement changes. The M allotments are usually where satisfactory management exists and major resource conflicts have been resolved. Most C allotments are small unfenced tracts intermingled with larger acreages of non-BLM managed lands, thus limiting BLM management opportunities. There are presently 79 Improve allotments, 25 Maintain, 125 Custodial, and three not assigned to a category. Generally, the resource conditions in the majority of allotments have been steadily improving. Grazing practices have changed for the benefit of vegetation, but juniper encroachment continues even with changes in grazing management. As rangeland conditions and site-specific objectives change, allotments are shifted from one category to another.

Allotment Management Plans (AMPs) are sometimes developed for larger I or M category allotments. An AMP prescribes the manner and extent that livestock grazing is conducted to meet multiple use, sustained yield, economic, and other objectives. A grazing system is generally incorporated into the plan. An AMP is implemented when it is incorporated into the permit and accepted by the permittee, and is operational when supporting range improvements and the grazing system have been initiated.

Urbanization and changes in ranch management are shifting the emphasis on public land from livestock grazing to hunting and recreation pursuits. More ranches are being acquired by individuals from large metropolitan areas who either hire a ranch manager, lease grazing to a neighboring rancher, or take nonuse. This trend is still small in the John Day Basin, but it appears to be growing.

Forest Products

To the casual visitor traveling through the John Day Basin forest resources on BLM lands are not immediately visible. And it is true that commercially valuable trees are not as widespread on BLM managed lands as on some private and Forest Service managed lands. Nevertheless these resources are valuable. Forest vegetation has the potential to provide both biological/physical and socioeconomic benefits.

This section will address forest products: timber production (sawlogs), biomass (wood chips and hog fuel), and small vegetative products (firewood, posts, poles, etc.). The size, location, accessibility, and type of material available vary throughout the analysis area. Based on these limitations generating forest products is not feasible on all areas of forest vegetation. Map 18: Key Vegetation Elements shows timber management zones. These zones have sufficient forested resources to provide forest products if production is consistent with management objectives.

Within the Interior Columbia basin the BLM oversees management of approximately six million acres of commercial forest land (USDA Forest Service 1996, p. 56). Forest land management responsibilities within the planning area are consistent with proportions found within the Interior Columbia Basin as a whole. Within the planning area the BLM has approximately 79,688 acres of forest land of which 11,994 acres of forest land were acquired through the Oregon Land Exchange Act of 2000. Comparatively the USFS controls 1,645,312 forest land acres (Forest Inventory and Analysis Mapmaker, 2006) within the planning area.

The largest acreages of forest lands occur in the Rudio Mountain, Dixie Creek, Little Canyon Mountain, and North and South Fork John Day River areas. Most of the acquired forest stands are located along the North Fork of the John Day River.

Timber Management

Prior to 1985 the forest vegetation was managed primarily for the production of timber while enhancing other resource values.

Within the John Day RMP area, between 1987 and 1997 a total of 11 timber management projects and 4 modifications to these projects were offered and sold. Total volume sold during this 11 year time span equaled 24,345 mbf which is an average of 2,213 mbf annually.

Since 1997, there have been four timber sales offered and sold. All four projects were timber salvage projects. All projects included the salvage of dead and dying trees but only two projects involved some commercial thinning of green trees in order to attain prescribed basal areas. None of these projects occurred within the area managed under the Two Rivers RMP during this same time span. During this 9 year period (1997-2005) 8,604 mbf of volume was offered, an average of 956 mbf annually. According to the John Day and Two Rivers RMPs, 32,220 mbf could have been sustainably offered during this same 9 year period.

The average annual rate of 956 mbf is typically enough volume to supply local mills for a period of a few weeks. Even during the most active of timber sale years the BLM in the past had been responsible for ⅓ or less of the necessary volume to support local mills.

Demand for timber from public land in the planning area will continue as long as there is a demand for wood products. If the current passive management trend continues, this demand will not be fulfilled.

Firewood

The current availability of firewood meets or exceeds demand. In recent years BLM has been issuing permits for approximately 120 cords per year. Prior to 1985 there was a greater demand for firewood. At that time firewood from logging slash was considered a waste product and all permits were free use. More than fifty permits were issued annually within the John Day RMP area. In the early 1980s the BLM started selling firewood permits for two dollars per cord. The current cost for a firewood permit is five dollars per cord.

In addition to forest species, juniper slash is also made available for firewood. Occasionally slash piles have become available and the BLM issues free use permits in order to utilize the more undesirable material for firewood. In recent years there appears to be an increase in the amount of illegal firewood removal.

Other Vegetative Products

Demand for other vegetative products (post, pole, cones, juniper bows, biomass) has been steady. These products are made available upon request, generally 5-10 permits per year primarily for post and poles. Current supply meets or exceeds demand and is expected to remain adequate in the future.

The removal of forest biomass for energy production has been considered within the planning area. Although sufficient biomass exists on BLM lands for energy production many of these lands are scattered with limited access. This reduces the economic feasibility with current technology and infrastructure. There is a potential benefit to the wildland-urban interface (WUI) by removing biomass; however, the amount of WUI in the planning area would not provide a substantial or sustainable amount of biomass.

Prairie Wood Products in Prairie City has a cogeneration plant associated with its mill. While the area of forestland controlled by the BLM is small, future juniper removal could supplement energy production needs at this plant. In 1988 Grant and Wheeler counties had juniper trees on more than half of their non-timber land area, indicating an expansion of juniper into many areas that formerly had little to no juniper (Gedney *et al*, 1999).

Native American tribal groups and individuals use of various plants for traditional foods and industries from public lands in the planning area. This use remains largely uncharacterized, although it is subject to treaty rights for gathering in ceded lands

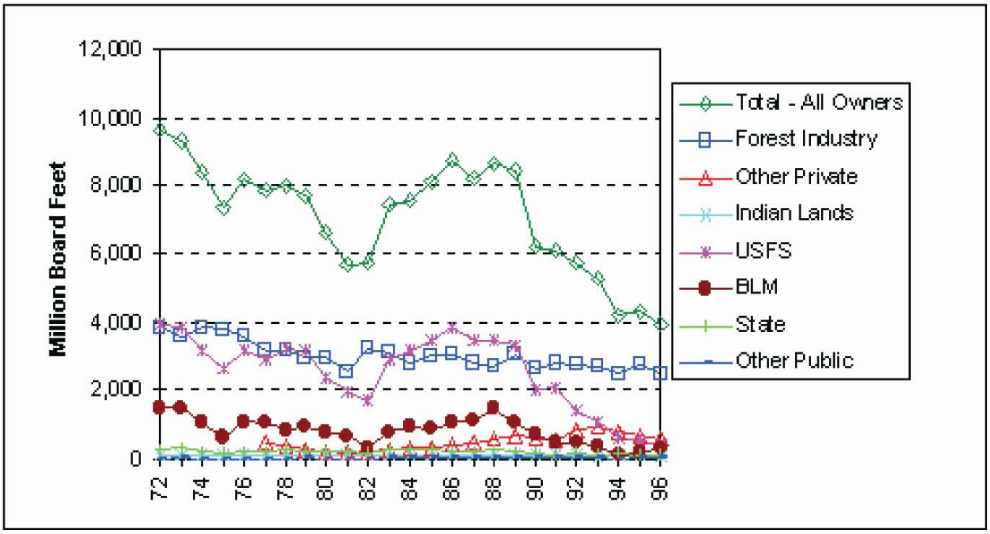
Trend

Timber harvest volumes have declined across most ownerships since the early 1990s. The decline has been the most pronounced on Federal lands during that time frame. Figure 3-34, represents statewide trends. Trends within the John Day Basin are similar.

The availability of firewood material is expected to continue to increase. The increase of the material is a result of the increase in mortality due to insects and diseases. As stressed trees die they lose their commercial value and are often available for firewood. However, only a small percentage of these dying trees are within a reasonable distance of open roads and available for firewood use. Demand for firewood in the planning area has been minimal and is not expected to dramatically increase within the next 10 years.

As energy demands increase and additional technologies are developed, demand for biomass is expected to increase and become more economically feasible.

Figure 3-34. Timber Harvesting in Oregon by Ownership



Timber Harvesting in Oregon by Ownership, 1980-95 (ODF)

Recreation

A wide variety of recreation opportunities are provided in a variety of settings on BLM land throughout the John Day Basin. Some of these activities include whitewater rafting, kayaking, canoeing, fishing, hunting, horseback riding, riding OHVs, camping, bird watching, rock hounding, photography, and sightseeing. Opportunities also exist for driving for pleasure and sightseeing for geological, botanical, zoological, archaeological, historical features and points of interest. In addition to locations where BLM public land is concentrated, recreation also occurs on state or county roads that provide access to BLM and USFS public lands.

An example of high quality sightseeing opportunities on public lands is the Journey Through Time Scenic Byway. This byway highlights the John Day Basin's geologic and human history as it travels from Biggs, Oregon near the John Day River's confluence with the Columbia River, parallels miles of the John Day River including the scenic Picture Gorge area, and continues east of the city of John Day. Other popular sightseeing routes include the South Fork Back Country Byway along the South Fork John Day River near Dayville, and the North Fork of the John Day River northeast of Monument. An important aspect of sightseeing is the opportunity to view and photograph wildlife ranging from tiny hummingbirds to deer, bighorn sheep, elk, black bears, and perhaps the occasional glimpse of a mountain lion. Sightseeing also occurs throughout the planning area.

Visitor use of the John Day Basin has increased and the season over which use occurs has expanded. Estimated annual use of BLM lands within the John Day River corridor was approximately 96,000 use days in 2003. Approximately 40,000 use days occur on the uplands within the JDBRMP area. Most visitor use occurs on the John Day River during the spring, summer and fall. In the spring and summer, visitor congestion occurs at popular watercraft launch and take-out sites at Service Creek, Twickenham, Clarno, and the Cottonwood Bridge. In the fall, hunting season encourages a similar increase in visitors.

Recreation Facilities

There are 16 developed recreation sites managed by BLM within the planning area (see Map 11, Chapter 2). Most of these sites are adjacent to the John Day River. None of the recreation sites within the planning area provide drinking water or trash receptacles. Most sites meet the accessibility requirements under the Americans with Disabilities Act.

BLM manages four developed campgrounds which are also available for day-use; Big Bend and Lone Pine on the North Fork John Day near Kimberly, and Muleshoe and Service Creek on the mainstem near the community of Service Creek. Each provides picnic tables, campfire grates, and vault toilets and each accommodates car

camping, except Service Creek which provides walk-in campsites. Service Creek recreation site is owned by the Oregon Department of Transportation and managed and maintained by BLM under a lease agreement.

Four recreation sites are managed specifically for day use in the John Day Basin planning area. These include Monument River Access Park along the North Fork John Day in the town of Monument. In addition three sites exist along the mainstem of the John Day; Shady Grove near Spray, Clarno where State highway 218 crosses the river west of Fossil, and Cottonwood Bridge where State highway 206 crosses the river east of Moro. Clarno and Cottonwood are owned by the Oregon Parks and Recreation Department (OPRD) and are managed cooperatively by OPRD and BLM under a long term-lease agreement.

Five additional developed recreation sites are located in Wheeler County along the mainstem John Day River. Two sites are managed primarily for dispersed use, which are areas open to use with no specific locations for camping or picnicking identified. These are Priest Hole, which is accessible by vehicle, and Burnt Ranch Beach, which is accessible by foot or boat. Three additional sites are managed primarily for boat launching. These include Wooden Bridge, Lower Burnt Ranch, and Twickenham. Twickenham is available for boat launching and vehicle parking only and is a privately owned site managed under agreement by Oregon Department of Fish and Wildlife and maintained by BLM.

BLM manages two interpretive sites located along the historic Oregon Trail. These are the John Day Crossing on the west side of the mainstem John Day near McDonald Crossing, and the Four Mile historic site on the east side of the mainstem near the community of Ione. These sites contain wooden ramadas which house interpretive displays depicting emigrant life on the Oregon Trail. John Day Crossing is owned by Sherman County Historical Society, and currently managed by BLM. A small picnic site, Rock Creek, is located near McDonald Crossing on the east side of the mainstem.

Within the planning area, there are many developed recreation sites managed by other federal, state, and county agencies. Developed campgrounds include Clyde Holliday State Park along State highway 26 near Mount Vernon, Bear Hollow and Shelton Wayside operated by Wheeler County, and approximately twelve U.S. Forest Service campgrounds spread throughout the Ochoco, Strawberry, and Blue Mountain Ranges. Several private campgrounds are also available within the planning area.

The most popular day use sites within the planning area are located within John Day Fossil Beds National Monument. These day use sites are set aside to study, protect and display the rich fossil beds and unique geological features of the John Day River Valley. The monument includes three separate management units; Clarno, Painted Hills, and Sheep Rock. The Thomas Condon Paleontology Center in the Sheep Rock Unit opened in 2005, and serves as the monument's visitor center. Hiking trails, interpretive displays, and picnic facilities are available in all three units. A variety of city and county parks are also available for day use.

Trends show a gradual increase each year in visitor use at BLM developed recreation sites. Use at the John Day Fossil Beds National Monument is expected to increase considerably as visitors discover the new Paleontology Center. With no camping facilities available within the monument, there is expected to be an increased demand for public and private campgrounds located near the monument.

Rivers, Scenic/Back-Country Byways and local events are increasingly being promoted as travel and tourist destinations by local Chambers of Commerce and other groups. The acquisition of additional public lands along the North Fork John Day (a result of the Oregon Land Exchange Act of 2000) brings a potential for new recreation opportunities to the region.

Recreation Activities

Rockhounding

Rockhounding is a popular recreation activity in the planning area. Some public lands in the planning area contain agate, quartz, calcite, zeolites, petrified wood, dendrites, thunder eggs, opal, ammonites and leaf fossils. These prized items occur on scattered parcels of public land, some of which are surrounded by private land and contain no legal public access.

Boating

Floating the John Day River in a raft, kayak, canoe, driftboat, or pontoon boat is a popular recreational activity. When asked in a 2000/2001 social survey, 94% of respondents listed peace and solitude, viewing scenery and wildlife, being with friends and family, and riverside camping as the most important reasons they boat the John Day River. The most popular sections for boating include the mainstem from Spray downstream to Cottonwood Bridge, and the North Fork from Dale downstream to Monument. In some sections, multiple launch points and easy access present a variety of options for one-day float trips. Other sections, with little to no public road access, offer the rare opportunity for remote, multi-day float trips up to 8 days in length. The primary boating season extends from early May to mid-July, except during drought years when low water flows shorten the season. The difficulty of rapids ranges from Class I to Class IV and varies by river section and flow level. Powerboat use is regulated by river section and by season, with restrictions designed to provide a variety of boating opportunities throughout the river system as a whole, and to enhance the management goals for each river segment.

In 2004, the BLM's boater self-issue permit system recorded 16,192 boater use days between Service Creek and Clarno, of which 85% consisted of overnight trips. Boating use is increasing at an average of 3% each year, with the greatest increase occurring in river sections offering opportunities for shorter trips of one to three days in length. On peak weekends and holidays, the number of overnight boating groups exceeds the number of public land campsites located within a reasonable boating distance of major launch points. As use levels increase, competition for public land campsites increases, and boating groups who are unsuccessful at finding a public land campsite stop on private property to camp. The BLM administers 26 Special Recreation Permits which authorize commercial guides and outfitters to operate a business on the John Day River. In 2004, commercial boating use days between Service Creek and Clarno accounted for 10% of the total boating use days.

BLM employees staff river launch points during boating season to encourage boaters to care for the river by practicing Leave No Trace outdoor skills and to respect private property rights. Regulations limit group size to 16 people, and the use of firepans and river toilets is required. No fires of any kind are allowed between June 1 and September 30. Self-issue permits, available at most river access points, are required year-round.

Fishing

Fishing is a popular recreation activity throughout Oregon and in the planning area. Fishing for bass, steelhead, and trout occurs on the main-stem of the John Day River and on the North, Middle and South Forks. To protect limited populations ODFW does not permit angling for bull trout and Chinook salmon on rivers and streams within the John Day Basin.

Steelhead fishing provides limited recreational opportunity in the John Day River and its tributaries as fish populations appear to be declining. Steelhead fishing generally occurs from November through January. Wild steelhead with unclipped adipose fins cannot be kept, however they can be caught if released unharmed. During most seasons some fin-clipped hatchery steelhead may be retained, however hatchery strays account for only 6-8% of the total steelhead population on the John Day River and its tributaries. The trout fishery has declined slightly from historic levels, but trout fishing continues to be a recreation opportunity enjoyed by visitors to the area.

Smallmouth bass fishing is growing in popularity and generally occurs from May to the end of October. The increase in popularity of bass fishing in the basin is due to word of mouth and media coverage in fishing publications. Consider the statement on flyfishusa.com, "In 1971, Seventy-five Smallmouth Bass were introduced to the river. Since then, they have flourished! The John Day River is arguably the best Smallmouth Bass water in the country."

Hunting

Big game hunting is a major recreational activity and opportunities exist for hunting deer, antelope, elk, bighorn sheep, black bear and cougar. A limited number of antelope, and a very limited number of big horn sheep tags are issued in the planning area. Local, statewide and out of state hunters come to hunt big game, and game-birds. A variety of predators are also hunted, including coyotes, cougar and bobcat.

Visitor use for hunting occurs during the summer, fall and early winter months and generally occurs on large tracts of BLM public land and on adjacent USFS lands. The planning area includes all of the Fossil, North side, Desolation, and Murderer's Creek hunting units and part of the Biggs, Heppner, Columbia Basin, Beulah, Ochoco and Grizzly units. These units are established and regulated by the Oregon Department of Fish and Wildlife (ODFW). ODFW establishes management objectives for each species within each hunting unit. The BLM issues special regulation permits in order to regulate commercial hunting on public lands.

About 5,000 deer and 2,700 elk were harvested by sport hunters within the John Day Basin. Information about hunting success is provided by management unit by ODFW. Consequently these numbers are approximate and do not indicate the ownership of the land on which the animals were taken.

Upland bird hunting occurs primarily during fall and early winter in shrub lands and riparian areas, with some bird seasons extending into March of the following year. Waterfowl hunting for duck and geese occurs in the fall and early winter on the John Day River and tributary rivers. The mainstem of the John Day River is closed to waterfowl hunting downstream of Thirtymile Creek within the John Day Wildlife Refuge managed by Oregon Department of Fish and Wildlife.

Statewide the number of Oregon resident deer hunters has declined over the past 30 years, while sales of elk tags have remained relatively constant. In contrast the number of elk hunters from out-of-state has increased over this time period. However the sale of both resident and non-resident deer and elk tags are anticipated to decline over the next five years. Nevertheless hunting for deer and elk are expected to remain popular recreational activities in the planning area.

Off Road Motorized Recreation

Off-road motorized vehicle use is allowed on the majority of BLM managed lands in the planning area. However, on about 60 percent of these lands restrictions limit the season of use or the routes open to motorized use, or both. Less than 15 percent of BLM managed lands are closed to all motorized use.

Off highway (OHV) or all terrain (ATV) vehicles have one of 3 classifications:

Class I: designed to travel on 3 or more tires
- 50 inches wide or less
- 800 lbs or less dry weight
- Saddle or seat

Class II: Wider than 50 inches or
- Over 800 pounds dry weight

Class III: Rides on 2 tires
- Less than 600 lbs dry weight

People drive off road throughout the year, primarily for gaining access to other recreational activities such as hunting, looking for horn sheds, and fishing. Hunters use all terrain vehicles (ATV refers to vehicles less than 50 inches wide) on BLM lands in late summer to scout for big game, in fall to hunt and retrieve big game, and in fall and winter to access upland bird hunting areas. Commercial horn hunters use ATVs in late winter and early spring to hunt for recently dropped deer and elk antlers. In addition, people drive off road for the pure fun of riding in some parts of the planning area. Off-road motorized use in the planning area is occurring in nearly every block of BLM managed land that is accessible to the public or to adjacent landowners, even where current restrictions prohibit such use. This widespread use appears to be limited only where steep, impassable terrain makes off road use unfeasible.

Designated Route Systems

In a designated route system, all open routes open to travel are signed as designated routes. All routes not marked as designated routes are closed. Designated route systems are in place in all WSAs, on the west side of the John Day River north of Clarno, and in the Murderer's Creek area along the South Fork John Day River. However, even with a designated route system, users regularly drive past closed signs and off of designated routes.

Lower John Day River

Though much of the BLM land adjacent to the lower John Day River is closed to off-road motorized vehicle use due to management guidelines for WSA and Wild and Scenic River, unauthorized use of continues to occur. In addition, adjacent land owners and fee hunters from adjacent private lands operate OHVs on BLM lands not open to the general public.

Rudio Mountain

Motorized use on Rudio Mountain occurs on old logging spur roads on all of these public lands. Primary use of OHVs is to support hunting with occasional sightseeing trips.

Upper John Day

The Little Canyon Mountain project area includes 2,498 acres of public land designated as Open to motorized use. A 104-acre mining pit is currently used as a play area by trucks, ATVs and motorcycles. The pit area also provides access to many user created OHV routes in the area. An irrigation ditch runs through the pit and is often diverted by vehicle users to create a 'mud-bogging' area. OHV users test their skills against steep and varied terrain in the area.

The Little Canyon Mountain area has a history of mining, and many vehicle routes are currently used to access mining claims. In addition to mining, the pit area has historically been used for dumping garbage, furniture, appliances, and old car bodies, in addition to target shooting. Recently, the pit area has been cleaned up and barriers have been constructed to prevent full size vehicles from entering the area and dumping trash. The BLM regularly receives complaints about motorized vehicle use in this area, especially regarding noise.

Dixie Creek is another area receiving significant OHV use. Past mining and timber management activities have resulted in numerous routes on public lands in this area. A county road provides access to BLM lands, though scattered private lands are intermingled with BLM lands throughout this area. The BLM public land boundaries in this area are not marked, resulting in public land use mainly by local residents. ATV, motorcycle and vehicle use in this area have resulted in new OHV trails being created. OHV use associated with mining also occurs in the Dixie Creek area.

North Fork John Day River

In the past, roads were developed in this area where needed to harvest trees and manage cattle. These roads are generally located in river and creek bottoms, but some old routes skirt steep side hills.

Since the BLM acquisition of additional lands in this area, and the subsequent interim closure of most roads, there have been repeated violations of road closures. Trespass on private land also continues. These violations primarily occur during deer and elk hunting seasons.

OHV use on adjacent U.S. Forest Service Managed Lands

OHV use on adjacent U.S. Forest Service Umatilla, Wallowa-Whitman and Malheur National Forests has also increased dramatically since the mid 1980s. OHV use on these forests has become a year-round recreation activity. According to the tri-forest Current Management Situation Report for the U.S. Forest Service Blue Mountain Plan revision (AMS), OHV use is associated with hunting prior to and during hunting seasons, with vacation & leisure-time use during summer months, and with local residents year-round. 1

OHV Use Trends

OHV use of BLM public lands within the planning area has dramatically increased since the Two Rivers, John Day and Baker RMPs were finalized in the 1980s. Increased OHV use on BLM public lands in the planning area has resulted from more recreation users coming to eastern Oregon to hunt, fish, camp, and ride OHVs for fun. These OHV users continue to create unauthorized trails on BLM managed land.

Nationally annual sales of ATVs (four wheeled OHVs less than 50" wide) more than tripled between 1995 and 2003, to more than 1.1 million ATVs and motorcycles sold in 2003. It is logical to assume that this trend is reflected in Oregon and increased OHV use in the John Day basin is a consequence. ATVs continue to account for more than 70 percent of the OHV market. Cordell (2005) found that in the western region including Oregon, the highest average OHV user days were attributed to the 51 and older age group. However, in just Oregon, the age group showing the greatest participation in OHV use was under age 30 at 25.3 percent.

The 2003 State Park Statewide Comprehensive Outdoor Recreation Planning (SCORP) survey for northeastern Oregon, which includes the JDBRMP area, found motorized activity increasing with almost all types of riders since 1987. Specifically, this survey found four-wheel use had increased 48 percent, OHV riding 47 percent, motorcycle use 73 percent, and snowmobiling increased 10.1 percent. These trends are valid for both BLM and U.S. Forest Service public lands since these riding opportunities are primarily on these public lands in this region.

In addition to the increase in the popularity of OHVs, the advancement of OHV technology has led to more user-friendly four wheel drive vehicles which enable recreation users to go cross-country and cover broader ranges of terrain than before. Each year BLM receives complaints associated with motorized use, specifically vehicles in closed areas, trespass on private lands, wildlife disturbance, and soil and vegetation damage due to cross-country use over muddy terrain. Public lands in riparian areas are particularly susceptible to damage. For example, despite a motorized use closure, users enter the John Day River channel at Clarno, Cottonwood, and other locations during low water periods and drive in the channel for many miles to access the river canyon. Some OHV users drive into the John Day riverbed at low flows to camp, leaving behind fire rings filled with trash that wash into the river when flows increase.

Conflicts continue to increase between public land users and adjacent private land owners who are concerned about trespass. Unauthorized OHV use is most frequent on BLM public lands in the North Fork of the John Day, Sutton Mountain/Pat's Cabin and Spring Basin areas. Unauthorized OHV use also occurs on public lands where no public access is available, such as public lands on both sides of the John Day River from Kimberly to Tumwater Falls, Rudio Mountain, and public lands south and south west of Kimberly. In addition trespass is common, during the fall hunting season in game units such as the Heppner unit, where OHV use on USFS and BLM roads and primitive routes has increased.

More user-developed trails on BLM public lands and also U.S. Forest Service designated Class I (ATV) and Class III (motorcycle) trails are available to ride than in past years. Despite this increased use, there are fewer BLM and U.S. Forest Service on-site law enforcement officers in popular OHV use areas to manage this use.

Commercial Recreation

Some individuals do not have the knowledge, skill, equipment, or time to engage in and plan float, fishing, or hunting trips or any of a range of recreational activities that take place within the John Day Basin. As a result guide, equipment rental, and shuttle operations have developed to serve this population. Currently guiding and boat rentals involving the delivery and pick up of boats at BLM managed sites are regulated by the BLM. The BLM issues Special Recreation Permits (SRPs) to authorize authorize commercial use, competitive use, vending, special area use, and organized group activities or events on public lands and related waters. SRPs enable the BLM to manage visitor use, protect natural and cultural resources.

Within the planning area, BLM currently administers 26 river related SRPs authorizing boat rental, guiding, hunting, and fishing on specified sections of the John Day River. The activities and areas authorized vary by individual SRP. In addition, the BLM administers three upland SRPs for guided hunting during specific hunting seasons and in specified areas. The term of each SRP ranges from one to five years based on an annual evaluation of the permittee's performance.

Between 1996 and 2006, the number of commercial SRPs for the John Day River dropped from 34 to 26 due to non-renewal of an SRP by the permittee, or non-renewal by BLM due to failure to meet permit stipulations. Public demand for outfitter and guide services may be decreasing based on lower numbers of user days reported by guides and outfitters. Most permitted guides and outfitters depend on John Day River trips for only a portion of their income, supplementing it with other sources of income, including guiding and outfitting on other rivers or income derived from other businesses or employment.

The BLM has had a moratorium on issuing new commercial guide and outfitter permits for the John Day River since 1996. In 2001 the John Day River Plan required a needs assessment to identify a need for a particular river-related service before a new commercial guide or outfitter permit could be issued.

An estimated 15 vehicle shuttle services are used by John Day River boaters, and none are currently under BLM SRP because the services do not traverse more than one mile of BLM-managed land or water.

There have been no competitive event or vending SRPs issued within the planning area, although a John Day River Plan decision allows BLM to consider issuing vending permits at river launch points to benefit resource protection, such as for the sale of river toilets, firepans, or firewood. The BLM occasionally issues SRPs for organized group activities or events within the planning area.

In 2001, the Prineville District limited the availability of new SRPs for commercial, competitive, and organized group use on public lands within the district boundary. New SRP proposals will be considered for authorization for activities or events not exceeding seven consecutive days in length annually which do not require preparation of an environmental assessment. The BLM has received numerous requests for new river SRPs as well as new upland SRPs for guided hunting, nature hikes, and paleontological tours.

Access and Travel Management

Primary ground transportation within the planning area is provided over a mix of federal, state, and county roads and highways. Except for the extreme northern portions of the planning area most of the John Day basin is connected by basically rural roads. While the surface of the federal highways and many of the state and county routes are generally in good condition these roads cross difficult terrain and wind around and over rivers, streams, canyons, rimrock, and mountains.

Federal Interstate, State Highways, and County Roads

BLM managed lands are accessible from federal interstate, state highways, county roads, local roads and private residences. Widespread access to BLM managed public lands provides opportunities for a variety of recreation opportunities; range, timber and mineral utilization; and helps provide access to different land ownerships. Local communities are connected by a road system that traverses and meanders through the Eastern Oregon landscape.

Interstate 84 parallels part of the northern end of the planning boundary along the Columbia River. This interstate is a major route used by travelers and commercial trucks between the western and eastern portions of the country. Recreationists and other public land users from the Portland and Seattle areas also use this interstate highway in their trek to public lands in the planning area.

U.S. Highway 26 is a major travel corridor through the heart of the planning area and extends in an east-west direction. U.S. Highway 395 bisects the eastern part of the planning area from North to South. US Highway 97 extends in a North – South direction from Madras to Biggs and forms part of the western planning area boundary.

In addition to the above routes, state highways and county roads provide access within the planning area. These state highways and county roads connect local communities, and ranches, to the John Day River, BLM, Forest Service and National Park lands. These routes also provide for travel within Eastern Oregon and to adjacent states. Table 3-24 summarizes interstate, U.S. and state highway mileage within the planning area by county.

Table 3-24. Summary of U.S. and State Highway Mileage within the Planning Area

County	Interstate, U.S. or State Highway	Miles
Baker	**County Total:**	**0**
Gilliam	I-84	51.53
	SR 19	52.99
	SR 206	39.35
	SR 74	8.05
	County Total:	**151.93**
Grant	US 395	80.25
	US 26	76.55
	SR 402	34.85
	SR 19	19.01
	SR 7	7.48
	County Total:	**218.14**
Jefferson	**County Total:**	**0**
Morrow	SR 207	0.06
	County Total:	**0.06**
Sherman	US 97	47.80
	SR 206	16.06
	I – 84	10.06
	SR 216	0.50
	County Total:	**74.42**
Umatilla	US 395	2.70
	County Total:	**2.70**
Wasco	SR 218	13.35
	US 97	3.17
	County Total:	**16.52**
Wheeler	SR 19	50.13
	US 26	45.88
	SR 207	39.79
	SR 218	19.24
	County Total:	**155.03**
Grand Total:		**619.10**

BLM GIS Road database; 2006

Although state and many county roads are paved, these roads are crooked and traverse hilly topography, increasing travel time between communities. During winter months travel between communities requires longer driving times and is frequently hazardous. In addition, limited county road funding restricts road maintenance, road re-construction, sign and ditch maintenance, and snow plowing. Table 3-25 identifies mileage of county road types within the planning area, which shows a predominance of gravel, cinder or primitive roads maintained by counties within the planning area.

Table 3-25. County Transportation System in the John Day Basin RMP Area

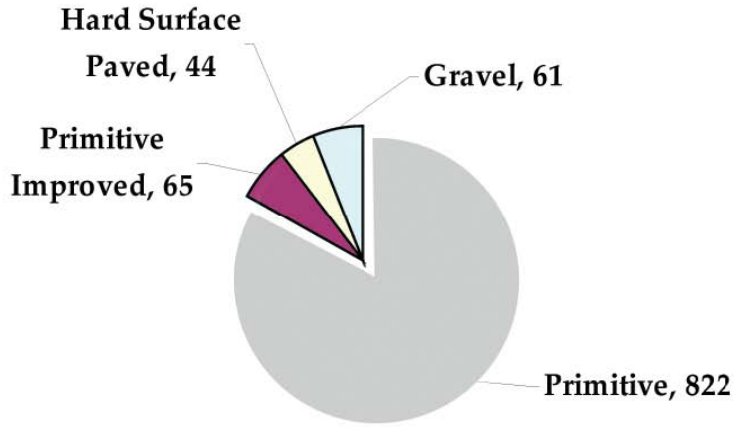
County	Paved Road	Gravel, Cinder Primitive Surface Road	Total Miles
Baker	0	0	0
Gilliam	21	429	450
Grant	215	353	568
Jefferson	0	60	60
Morrow	0	0.9	0.9
Sherman	86	190	276
Umatilla	0	0	0
Wasco	0	22	22
Wheeler	36	335	371
Total	**358**	**1,390**	**1,748**

Estimated County road mileage from BLM GIS road database; 2006

Roads Across BLM Lands

Within the planning area, a wide variety of road types are located on BLM public lands. Not all are maintained by BLM. Many of these roads are maintained and managed by entities such as the Oregon Department of Transportation, county road departments, utility companies, and other right-of-way holders, including private landowners. These various road types are illustrated in Figure 3-35 below.

Figure 3-35. Miles of Road on BLM Land by Surface Type



BLM Transportation System

There are three classes of routes in the BLM transportation system: roads, primitive roads, and trails. A road is a linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use. A primitive road is a route managed for use by four-wheel drive or high clearance vehicles. These routes do not normally meet any BLM road design standards. A trail is a route managed for human-powered, stock, or off-highway vehicle forms of transportation or for historical or heritage values.

The existing primitive road and trail network in the planning area is a combination of historic county roads, BLM maintained roads, roads once constructed that are maintained only by the passage of users, and trails created by a

variety of users. Existing routes have been constructed in the past for livestock or timber management, mining, and travel between cities and ranches. Many of these roads were created several decades ago and continue to be used, while others are no longer useable by motorized users. Approximately 250 miles of these roads are not accessible to the general public because they are connected to private roads (without pubic easements) across private lands. No standard exists for the retirement or obliteration of roads after they have served their functional purpose.

Recreationists, private land owners, and permittees use authorized and unauthorized primitive roads and trails to reach destinations throughout the John Day Basin area. BLM maintenance of primitive roads is done primarily on an "as-needed" basis. Unauthorized use on existing routes and cross-country motorized use has continued to increase annually. These actions continue to result in road rutting, soil compaction, increased muddy water runoff, disturbance to wildlife and trespass on private lands.

BLM Roads

Lower John Day River

Though considered part of the Lower John Day existing roads in the area immediately north of Clarno are displayed in Chapter 2 on the Map 12B Sutton Mountain Travel Management. From Clarno, approximately four miles of BLM un-maintained primitive road extends north to a locked gate just beyond the Sorefoot Creek drainage. There are no other BLM managed roads across BLM lands in the Lower John Day Area (See Chapter 2, Map 12A: Lower John Day Travel Management and Map 12B: Sutton Mountain Travel Management).

Sutton Mountain Area

In the Sutton Mountain area several small portions of BLM maintained roads exist. North of Mitchell, an old logging road extends east to west from Highway 207 to Bridge Creek Road. This road is called the Old Logging Road (BLM road 7548) and is a BLM maintained gravel road. The Priest Hole Road (BLM road 7559) is a BLM maintained natural surface road which extends from Bridge Creek Road down to the John Day River and then east to the Twickenham-Bridge Creek-Cutoff County Road (see Map 12B: Sutton Mountain Transportation in Chapter 2).

Rudio Mountain and Johnson Heights Areas

Along the Franks Creek Road (BLM road 6203), BLM has a reciprocal agreement with an adjacent land owner, D.R. Johnson, that specifies that whoever uses this 9.5 mile road segment maintains it. BLM maintains approximately 7 miles of the Timber Basin Road, which is open for BLM administrative and public use. Holmes Creek Road is maintained by BLM and extends south for approximately 8 miles until public access ends at private land. Just north of the Cant Ranch. The very rough, primitive and un-maintained Squaw Creek Road extends approximately 8 miles until private lands prevent further public access (See Chapter 2, Map 12 C: Rudio Mountain/Johnson Heights Transportation).

South Fork John Day River

The BLM maintains approximately 23 miles of gravel road on the South Fork John Day River. This road is maintained on an annual basis whereas all other BLM road maintenance in the planning area is done on an as needed basis. Grant County Road Department maintains approximately 1.5 miles of paved road and 7.5 miles of gravel road along this river.

Other routes off the South Fork John Day River Road are open seasonally. Jackass Creek and Murderer's Creek roads are limited to designated routes and open seasonally. This area is managed as a Co-operative Travel Management Area by the BLM, USFS and ODFW.

Two other areas in the South Fork John Day area are open seasonally: Battle Creek Road extends south of Highway 26 and Indian Creek road is open seasonally (See Chapter 2, Map 12 D: South Fork John Day River Transportation).

Indian Creek and Deer Creek roads provide access ties between the South Fork John Day River and Malhuer National Forest lands, while Sunflower Creek Road provides a tie to the Ochoco National Forest lands.

Upper John Day

There are 17 miles of undesignated roads on very steep terrain through public lands in the Little Canyon Mountain area. Many routes have no drainage built into them and rut easily due to high clay content. Many of these routes are used recreationally by OHV enthusiasts. Some routes provide access to mining claims (see Chapter 2, Map 12 E: Upper John Day Transportation).

North of Prairie City along County Road 58, an undesignated road extends to the Malhuer National Forest Boundary along Dixie Creek. This road is not maintained by the BLM but provides public access to the Malhuer National Forest in this area.

North Fork John Day River Roads

The North Fork John Day River Access Road (BLM road 7569) is a BLM maintained road following the North Fork of the John Day River from its intersection with Highway 395 downstream to about 2 miles east of the junction with Wrightman Canyon Road (County Road 15). Though there is no formal easement, the private landowner has not prevented public travel on the road thru his property.

A road exists downriver from the Wrightman Canyon Road, to the Wall Creek road (County Road 31). This primitive, un-maintained road parallels the north and west banks of the North Fork John Day River. There are 7.15 miles of road on BLM public lands and 7.85 miles of road on private land. No public easements exist through the private lands and no easements have ever been pursued or obtained by BLM or any other public agency. Private land owners have placed gates across this road in the early 1990s and in 2005. These gates have frequently been pulled out by users.

Two primitive, seasonally open roads lead to the north from the North Fork John Day River Access Road. The first, up Jericho Creek, has a small spur road but in either direction the road soon ends. Near the end of public access on the North Fork road the Mallory Creek Road extends into the Umatilla National Forest. There has been no maintenance on these roads to date. Several primitive roads that are open seasonally extend from the Umatilla National Forest BLM managed lands. Each of these routes ends near the top of rimrock overlooking the North Fork John Day River several hundred feet below.

Public access along the North Fork is available north of the city of Monument for 7.6 miles along County Road 31, to Wall Creek. This county road extends north, past Wall Creek, to BLM and Forest Service lands. At this point several un-maintained BLM roads are open seasonally from April 16 to November 30 (See Chapter 2, Map 12 F: North Fork John Day Transportation).

BLM Road Traffic Trends

Patterns of use on BLM managed roads within the planning area have not been systematically studied. It appears that OHV use on BLM roads, primitive roads and trails continues to increase throughout the planning area, especially during deer and elk hunting seasons. BLM public lands tend to be more popular and receive more OHV use, since OHV access is restricted on Forest Service lands adjacent to the planning area. The OHV section in this chapter describes user created trails and OHV user trends in more detail.

Recreation Access Trends

Private roads that were once open to the public are often no longer available for access to public land as private landowners place gates across these private roads. Recreational use of public lands has joined grazing and timber management as a primary use. Limitations on public access to scattered public lands and a transportation system that does not accommodate changing user needs has contributed to resource damage and increased the incidence of trespass on private lands.

Reduction in access has occurred as roads across private lands are decommissioned and open roads are not repaired. The location and distribution of scattered BLM lands require public land users to become familiar with adjacent private ownership patterns and routes open for public use. The fact that some BLM lands are isolated

from public access has also led to trespass. Patterns of land ownership can be confusing, and lead to inadvertent and sometimes intentional trespass on privately owned lands. The Johnson Heights area accessed by Squaw Creek Road experiences some of the most persistent hunter-landowner conflicts in the planning area. The many isolated BLM parcels in this area are coveted by hunters and some attempt to cross private lands at the end of public access in order to reach these lands.

Some ranches that in the past afforded their neighbors access to BLM managed lands have been divided or bought by "outsiders" who often manage for fee hunting. These changes in land ownership exacerbate the already limited access. This represents a change in landowner mindset, since they have historically allowed the public to drive on private roads to reach public lands.

While the public at large may be excluded from enjoying BLM managed lands surrounded by private lands, the private landowners and their guests frequently use OHVs to access public land for deer, elk, sheep and upland bird hunting.

Similarly commercial hunting guides pay a fee to gain access to public lands through private property. Some motorized users have attempted to access public lands through private property with and without landowner permission.

Motorized use is no longer available to the public in the Spring Basin WSA. This 5,982 acre area is located near the east bank of the John Day River, approximately 3 miles south of Clarno. In past years, motorized use occurred on approximately nine miles of undeveloped vehicle routes in this area. This access requires crossing a 40 acre parcel of private land, which has been closed to the public by the landowner.

Energy and Mineral Resources

Much of the early history of the North, Middle and Upper John Day basins involves the search for the "motherlode." For a few the search continues even today.

Early westward immigration to the planning area was in large part sparked and sustained by metallic lode and placer ore deposits found along the so called 50 to 100 mile wide Blue Mountain Gold Belt stretching from John Day eastward to the Snake River. Oregon's "golden years" began in the late 1800s and peaked several times before declining drastically in the mid-1960s. The new "hot" commodities are direct use geothermal heat and topographic features (ridge lines) with significant wind energy potential. There is also a growing speculative interest in possible natural gas deposits trapped beneath capping Columbia River basalts.

The quarrying of mineral material for construction purposes remains an important activity in the John Day Basin. Common material, such as sand, gravel, and aggregate literally form the foundation of community and regional infrastructure. Modern roads and building foundations would not be possible without these common materials.

The BLM currently manages 2.7 million acres of subsurface minerals in the plan area. Eighty-three percent of these mineral rights are overlain by land managed my state and federal agencies and the remainder is managed by private land owners. The BLM categorizes minerals as locatable, leasable, or salable minerals. Locatable minerals are minerals for which mining claims can be located under the 1872 mining laws, as amended. These include precious and base metals and some non-metallic minerals. Salable Minerals include common variety mineral materials such as sand, gravel, rock, and cinders. Leasable minerals include oil, gas, and geothermal and some solid mineral resources such as coal and oil shale. The distribution of mineral resources is described below.

Locatable Minerals

The potential for the occurrence of locatable minerals in the central and northern parts of the planning area is generally low because of the prevalence of relatively recent non-mineralized Columbia River Basalt flows in the Columbia Plateau Ecoregion and the northern portion of the Blue Mountain Ecoregion. The southern and eastern parts of the planning area generally have a moderate to high potential for locatable minerals due to scattered pockets of mineralization in the John Day and Clarno formations and in the accreted terrane rocks.

Lode and placer deposits containing **gold** and **silver** are present in the southern and eastern part of the planning area around Clarno, Antone, John Day, Canyon City, Prairie City, Granite, and in the Greenhorn Mountains. Like most gold deposits, the gold found in the area is a naturally occurring alloy with silver (Lindgren, 1901). As a result, silver was produced as a byproduct of gold mining. Silver was also produced from ores including tetrahedrite, stephanite, pyrargyrite, and copper ores.

Ores of **copper** are found in the Ashwood, Spanish Gulch, Canyon, Greenhorn, Susanville, Granite, and Quartzburg Mining Districts (Brooks and Ramp, 1968). The copper ores are present in the same veins that were mined for gold and silver.

Copper deposits are also found on the Strawberry Range crest between the summit of Canyon Mountain and Indian Creek Butte; a few other deposits occur just outside the western boundary of the Strawberry Mountain Wilderness (Thayer *et al*., 1981). Chalcopyrite, malachite, and chrysocolla are the primary copper-bearing minerals and occur mainly in lenticular quartz veins placed in gabbro host rock. All known copper deposits in the area are either too small or have an insufficient grade for production under current economic conditions. Occurrences of galena (ore of lead) are similar to that of copper in the planning area mining districts.

Deposits of **chromite** (ore of chromium) are located in the southeast part of the planning area in Grant County. Most of these deposits are in the Strawberry Range though a few also occur in the Greenhorn Mountains. Individual chromite deposits, ranging from a few hundred kilograms to 115,000 tons, occur as pods and lenses in peridotite, dunite, and serpentinite (Thayer, 1940; Thayer *et al*., 1981). At least 100 chromite deposits are recognized but most occurrences contain less than 100 tons.

Cinnabar (ore of **mercury**) was discovered in eastern Jefferson County in 1933. Small, isolated cinnabar deposits occur on the east and west sides of Canyon Creek in the southern part of the planning area. A notable mercury deposit was discovered in 1963 near the confluence of the East Fork of Canyon Creek and Canyon Creek (Thayer *et al*., 1981) where cinnabar occurs as fracture fillings and replacements in greywacke host rock. Cinnabar is also present in the Greenhorn Mining District (Brooks and Ramp, 1968).

Bentonite clay is another locatable mineral found within the planning area. Active mining claims are located in the area about 1.5 miles northwest of Clarno.

Other locatable minerals occur in the planning area. Deposits of chrysotile asbestos, nickel, and platinum-group metals (platinum, palladium, and rhodium) are found in the Strawberry Range and surrounding areas (Thayer *et al*., 1981). Zinc, lead, iron, arsenic, antimony, cobalt, bismuth, molybdenum, and manganese are all present in one or more of the mining districts in the planning area (Brooks and Ramp, 1968). Like copper and lead, these minerals are present in the same veins that contain gold and silver. Thus, minor amounts of these metals were produced from the gold and silver mines.

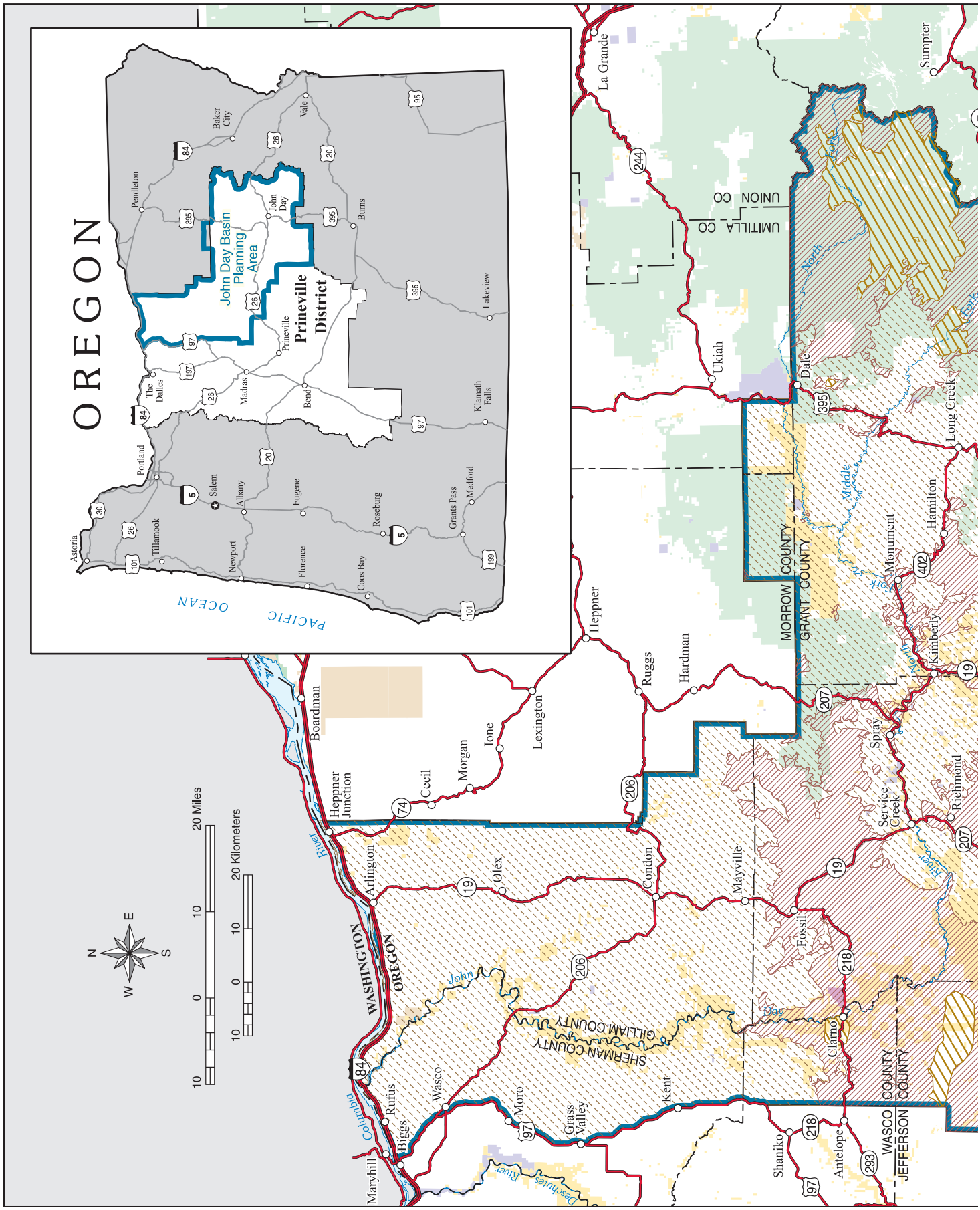
Mining Activity

Presently, there are 80 active mining claims within the planning area. Map 21 displays locatable mineral potential within the planning area.

Gold

The Canyon Mining District includes the area surrounding John Day and Canyon City. Notable placer deposits were mined in the John Day River and in Canyon Creek. Lode deposits in quartz veins were mined on Little Canyon Mountain and on Miller Mountain. Between the discovery in Canyon Creek in 1862 and 1908, an estimated 600,000 ounces of gold were produced from the Canyon Mining District (Thayer *et al*, 1981). Dredges in Canyon Creek and the John Day River produced 124,000 and 13,000 ounces of gold and silver respectively from 1916-1942 (Brooks and Ramp, 1968; Thayer *et al*, 1981). Relatively small amounts of gold have been produced from the Canyon Mining District since the last dredge was dismantled in 1942.

The Quartzburg Mining District includes Prairie City and the Dixie Creek drainage basin. Placer deposits are found both in Dixie Creek and the John Day River and six lode mines were also worked in the area. Reliable


OREGON
John Day Basin Planning Area
Prineville District
Astoria
Portland
Tillamook
Newport
Salem
Albany
Eugene
Florence
Coos Bay
Roseburg
Grants Pass
Medford
Klamath Falls
Lakeview
Burns
Bend
Madras
The Dalles
Prineville
John Day
Baker City
Pendleton
Vale
PACIFIC OCEAN
WASHINGTON
OREGON
Columbia River
John Day River
Deschutes River
North Fork
Middle Fork
South Fork
Maryhill
Biggs
Rufus
Wasco
Moro
Grass Valley
Kent
Shaniko
Antelope
Clarno
Fossil
Mayville
Condon
Olex
Arlington
Heppner Junction
Boardman
Cecil
Morgan
Ione
Lexington
Heppner
Ruggs
Hardman
Ukiah
La Grande
Dale
Sumpter
Long Creek
Hamilton
Monument
Kimberly
Spray
Service Creek
Richmond
SHERMAN COUNTY
GILLIAM COUNTY
WASCO COUNTY
JEFFERSON COUNTY
MORROW COUNTY
GRANT COUNTY
UMATILLA CO
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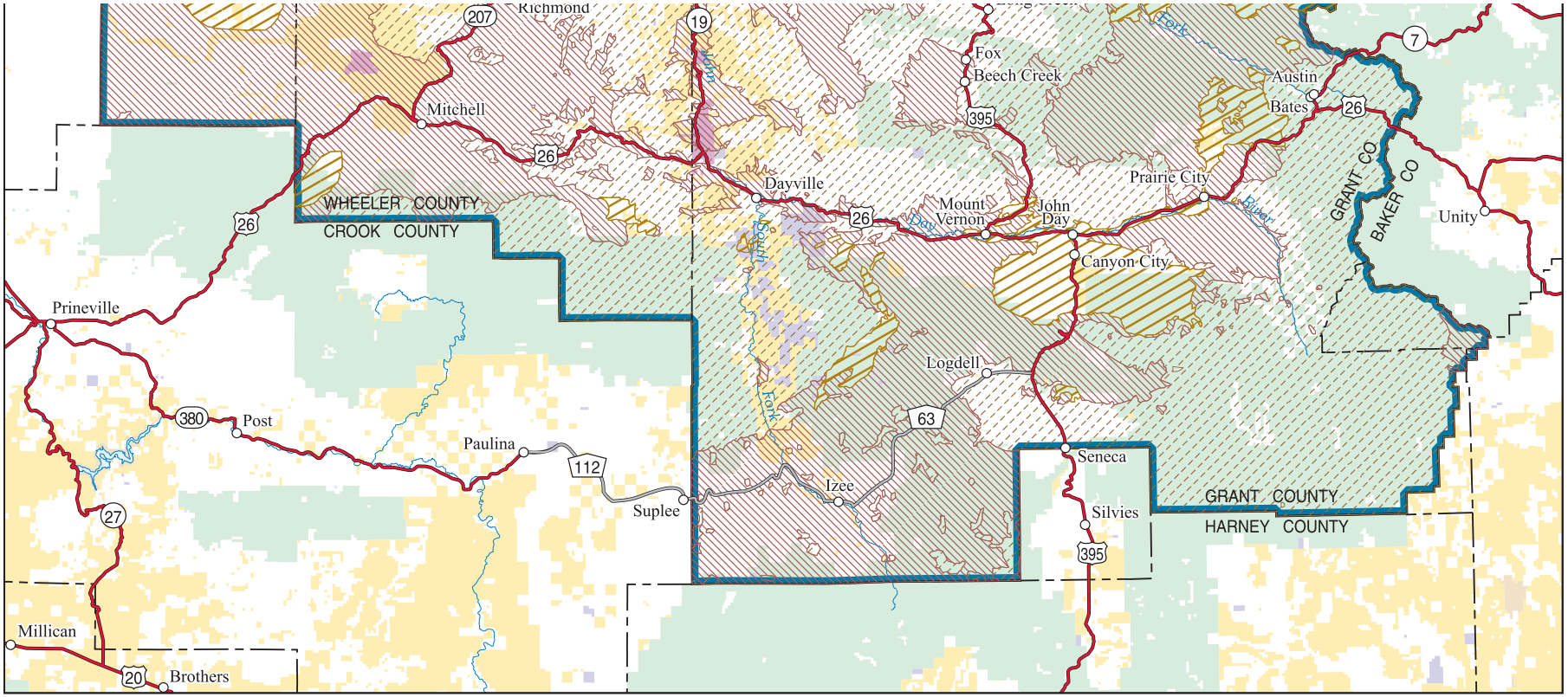

LEGEND

Locatable

- High
- Moderate
- Low

- Planning Area Boundary

Administered Land

- Bureau of Land Management
- Forest Service
- John Day Fossil Beds National Monument
- Other Federal
- State
- Private or Other

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Map 21: Locatable Mineral Potential

production figures prior to 1930 are not available. Dredges in Dixie Creek and the John Day River produced more than 22,500 ounces of gold from 1930-1941 (Brooks and Ramp, 1968).

The Spanish Gulch Mining District is relatively small and is located near Antone in southwest Wheeler County. Mining in the district began in 1864 (Willingham, 1982). Placer deposits in Rock and Birch Creeks were worked and some quartz veins were mined (Brooks and Ramp, 1968). According to Collier (1914), at least 5,000 ounces of gold were produced from the placer mining. This district has been designated as the Spanish Gulch ACEC for the historic mining structures that remain (USDI BLM, 1986), though mining no longer occurs there.

Other productive areas included the Granite, Greenhorn, and Susanville Mining Districts (Brooks and Ramp, 1968). All of these districts are located in northeastern Grant County.

Mining claims are still held in many of the historical mining districts, though most operations are small-scale (casual use). Present operations mainly involve small adits (horizontal or nearly horizontal mine entry dug into slope) and reworking of tailings left by the larger operations of the past.

Copper

In the Granite District, the Cougar, Independence, and La Belleview mines collectively produced 16,275 pounds of copper (Brooks and Ramp, 1968). Another notable producer of copper was the Standard mine in the Quartburg District. At total of 57 tons of ore containing 20% copper were mined and smelted (Brooks and Ramp, 1968). Copper ore was also produced from other mines in other mining districts but reliable production figures are unavailable.

All known copper deposits in the area are either too small or have an insufficient grade for production under current economic conditions.

Lead

The only notable recorded lead production was from the Cougar, Independence, and La Belleview mines in the Granite District; 34,598 pounds of lead were produced (Brooks and Ramp, 1968). Some lead was probably produced from the sulfide ores of other mines in other mining districts, but reliable production figures are not available.

Chromium

While chromite is not currently produced in the planning area, some claims are held in anticipation of more favorable economic conditions in the future. Historically, the chromite deposits of Grant County have not been able to compete with foreign sources with the exception of the three time periods of war (Thayer *et al*, 1981). Mining of the chromite deposits began in 1916 when World War I cut off chromium imports and continued until the war's end in 1918. Production resumed in 1939 and continued through most of World War II, ending in 1944. The last phase of production occurred from 1951 to 1958 as the U.S. government stockpiled strategic minerals during the Korean War (Thayer *et al.*, 1981; Orr *et al.*, 1992). In all, chromite production in Grant County reached 30,000 tons.

Mercury

The Horse Heaven Mine, located in eastern Jefferson County, was the largest producer of mercury (quicksilver) in the planning area. Mining for cinnabar (or of mercury) began in 1934 and continued intermittently until 1958 (Brooks, 1963). During this time, 17,214 flasks of mercury were produced, placing the Horse Heaven Mine was among the top 5 producers in Oregon (Orr, *et al.*, 1992). Other prospects and smaller mines are present in the area around Horse Heaven. The only other notable production was 150 flasks from the Axehandle mine (Brooks, 1963).

A notable mercury deposit was discovered in 1963 near the confluence of the East Fork of Canyon Creek and Canyon Creek (Thayer *et al.*, 1981). Production from the Canyon Creek Mine totaled 3,830 kg between 1963 and 1968. Currently, mercury is not being mined anywhere in the planning area.

Cinnabar is also present in the Diadem mine in the Greenhorn Mining District (Brooks and Ramp, 1968). No production records are available.

Bentonite

Bentonite clay is another locatable mineral found within the planning area. Active mining claims are located in the area about 1.5 miles northwest of Clarno.

Other Minerals

Deposits of chrysotile asbestos, nickel, and platinum-group metals (platinum, palladium, and rhodium) (Thayer *et al*., 1981), zinc, tungsten, iron, arsenic, antimony, cobalt, bismuth, molybdenum, and manganese are all present in one or more of the mining districts in the planning area (Brooks and Ramp, 1968). Like copper and lead, these minerals are present in the same veins that were mined for gold and silver. Thus, minor amounts of these metals may have been produced from the gold and silver mines.

Salable Mineral Materials

Most of the planning area has a moderate to high potential for the occurrence of mineral materials, such as sand, gravel, barrow and crushed rock. All maintained roads, sidewalks, airports, buildings and other permanent structures would not be possible without these common mineral materials. The high potential areas are in and around existing mineral material quarries and in rock deposits with known value for aggregate uses. Most of the high potential areas occur in alluvial deposits of sand and gravel, the Columbia River Basalt flows and other volcanic rock units known or likely to have a sufficient quality for use in asphalt.

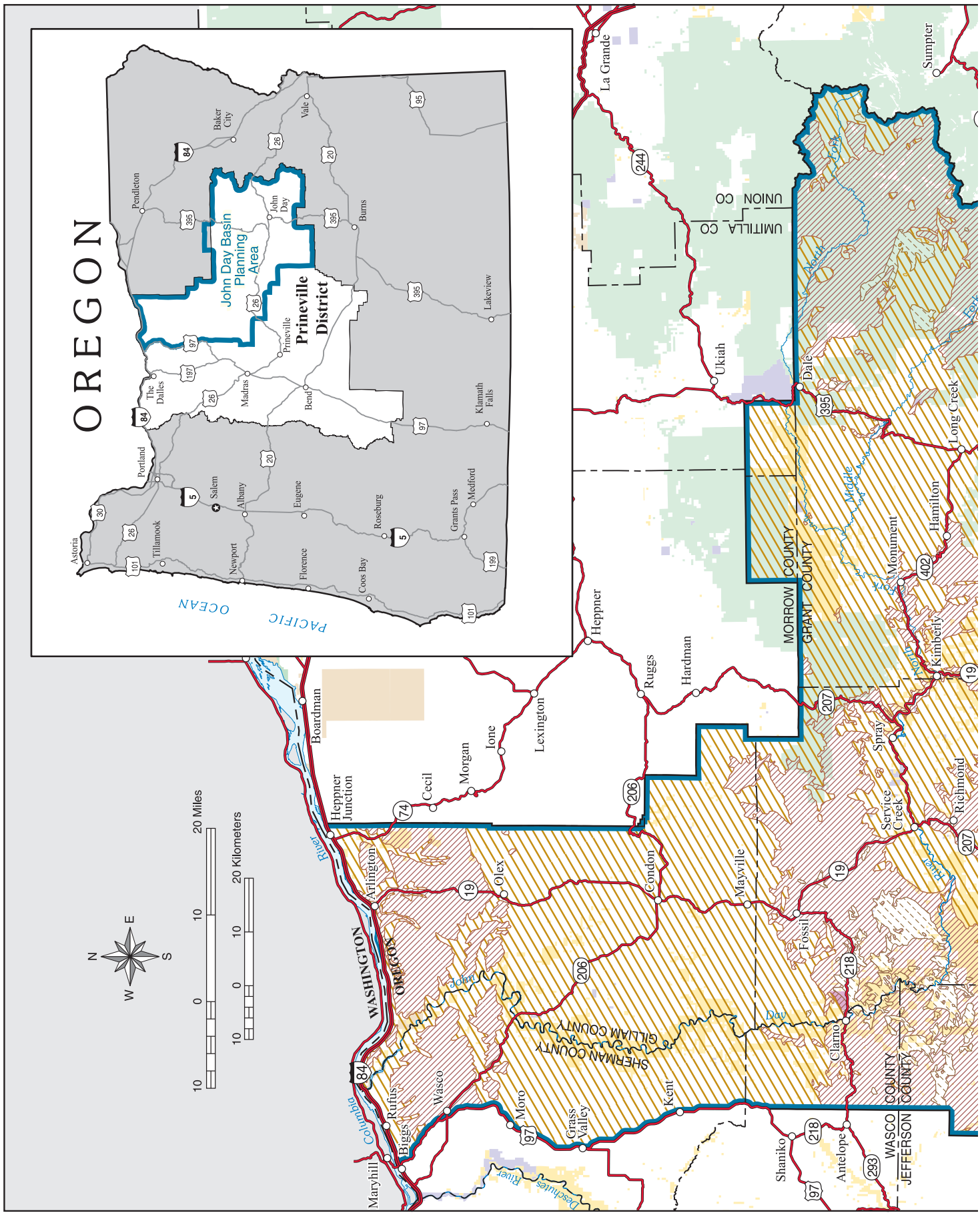
Salable Mineral Materials Uses

Common variety mineral materials such as sand, gravel, rock, and cinders may be purchased at fair market value or acquired by free use permits from the BLM. Free use permits are generally limited to government agencies and non-profit organizations. Mineral materials may also be mined under a material site right-of-way (ROW). Map 22 displays salable minerals within the planning area.

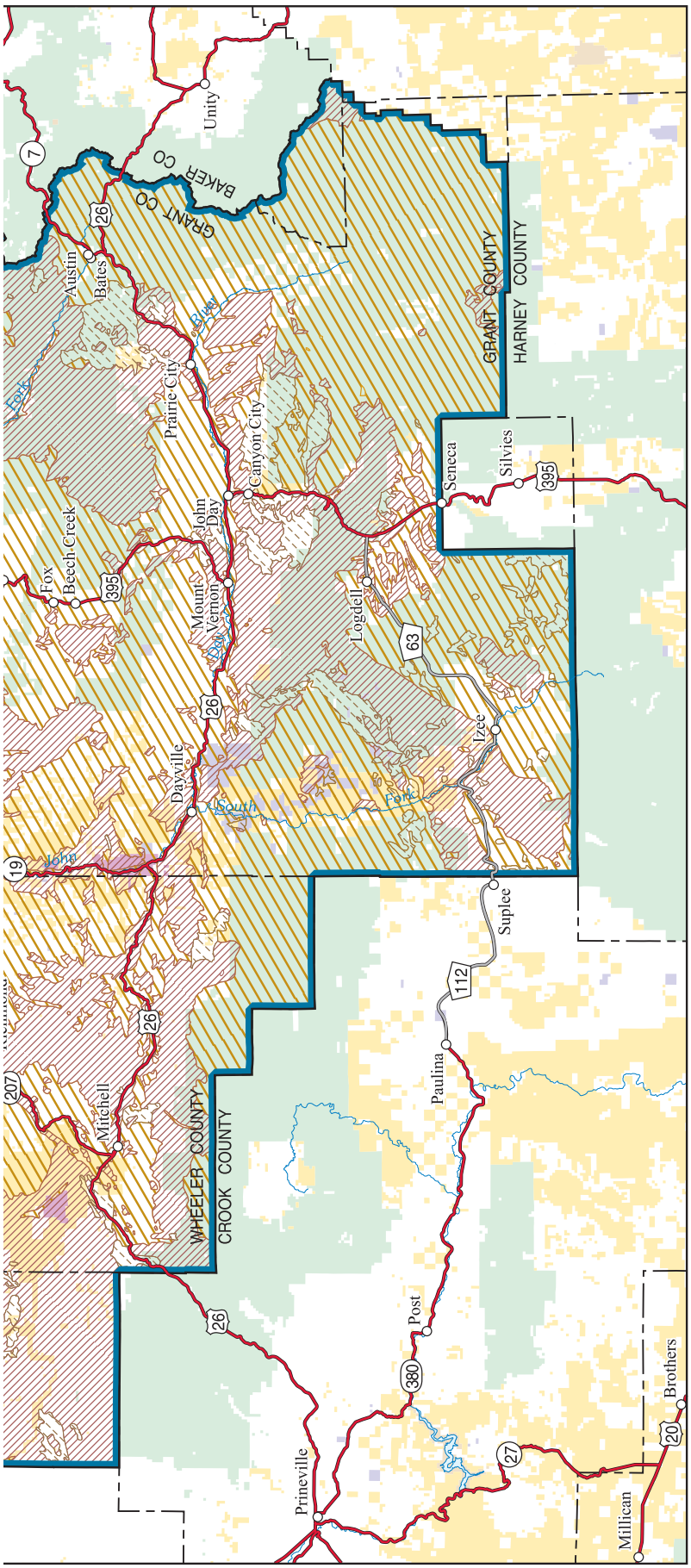
Currently, there are 15 mineral material sites (quarries) in the planning area, some of which have never been developed. Over the next 10 years, approximately 5,000 to 7,500 cubic yards of mineral materials are expected to be mined annually, mostly by Grant County. The Oregon Department of Transportation (ODOT) has 8 existing material site ROWs; only 2 of these sites have been developed. (See Table 3-26)

Table 3-26. Mineral Material Sites in the Planning Area

Site Name	Site Number	Owner/Operator	Instrument
Big Creek	OR-037135	BLM-Grant County	Community Pit
Bridge Creek	N/A	BLM	Unknown
Magic Lantern	OR-037134	BLM	
Meyers Canyon	N/A	BLM	Unknown
Meyers Canyon Hwy 207	N/A	BLM	Unknown
Monument Pit	OR-58539	BLM-Grant County	Free Use Permit
Smokey Creek	OR-036867	BLM	Common Use Area
Unnamed	OR-02126	BLM-ODOT	Material Site ROW
Unnamed	TD-029897	BLM-ODOT	Material Site ROW
Unnamed	TD-030633	BLM-ODOT	Material Site ROW
Unnamed	TD-030673	BLM-ODOT	Material Site ROW
Unnamed	TD-031358	BLM-ODOT	Material Site ROW
Unnamed	TD-031780	BLM-ODOT	Material Site ROW
Unnamed	TD-031811	BLM-ODOT	Material Site ROW
Willow Creek Quarry	OR-013350	BLM-ODOT	Material Site ROW



Map 22: Salable Mineral Potential



LEGEND

Saleable Potential

- High
- Moderate
- Low

Planning Area Boundary

Administered Land

- Bureau of Land Management
- Forest Service
- John Day Fossil Beds National Monument
- Other Federal
- State
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Map 22: Saleable Mineral Potential

Leasable Minerals

Leasable mineral resources include oil, gas, and geothermal and some solid mineral resources such as coal and oil shale. Occurrences of low-grade coal are found at various locations extending from near Fossil south and east to the community of John Day. Economic quality or quantities of coal, coal bed methane, oil shale and tar sands are considered to be absent from the planning area and are not addressed further in the planning document.

The potential for oil and gas ranges from low to high across the planning area. The presence of oil and gas has occurred in exploratory wells drilled near the NE-SW trending axis of the Blue Mountains anticline. This fold represents a potential trap for oil and gas and is therefore considered to have a high potential for oil and gas accumulation. Farther away from the fold axis, the oil and gas potential falls to moderate and then to low.

The potential for the occurrence of geothermal energy is moderate to high across the planning area. Available information on existing geothermal resources comes from 8 natural hot springs and 18 exploratory geothermal wells in the planning area. Data from other wells adjacent to the planning area were used to interpolate the geothermal energy potential to the planning area boundaries.

All of the hot springs are scattered throughout the southeast part of the planning area. Each hot spring is a surface indication of geothermal energy. All but two of the hot springs have temperatures exceeding 40 °C (104 °F).

Geothermal exploratory wells are somewhat evenly distributed across the planning area. Temperatures encountered in the wells range from 20 °C (68 °F) to 45 °C (113 °F). Only four of these wells have temperatures exceeding 30 °C (86 °F); all of the other wells have temperatures of 23 °C (73 °F) or less.

Mineral Leasing

Fluid mineral resources including oil, gas, and geothermal and some solid mineral resources such as coal and oil shale are obtained from BLM-administered lands by leasing. Presently, no areas within the planning area are leased and no exploration is occurring. This situation could change as technology improves or if energy prices rise notably.

Oil and Gas

Several exploratory or “wildcat” wells have been drilled in the planning area, mostly near Clarno and Mitchell. One well, located near Clarno, produced 4 million cubic feet of gas (Tennyson, 1995). Oil and/or gas shows were reported in at least 12 wells, but none represented commercial accumulations (Oregon Department of Geology and Mineral Industries, 1989; Tennyson, 1995). Other evidence of oil/gas accumulations comes from numerous water wells that have encountered asphalt-filled fractures and cavities and small amounts of gas. Map 23 displays oil and gas potential within the planning area.

Geothermal

Available information on existing geothermal resources comes from 8 natural hot springs and 18 exploratory geothermal wells in the planning area. Data from other wells adjacent to the planning area were used to interpolate the geothermal energy potential to the planning area boundaries. Map 24 displays geothermal potential within the planning area.

All of the hot springs are scattered throughout the southeast part of the planning area. It is not known if any of these hot springs represent geothermal reservoirs capable of supporting a geothermal power plant.

The geothermal exploratory wells are somewhat evenly distributed across the planning area. Only four of these wells have temperatures exceeding 30 °C (86 °F).

Minimum temperatures of 100 °C (212 °F) are required for geothermal power plant development. No temperatures in wells or hot springs in the planning area have temperatures sufficient for electricity generation. However, temperatures of about 20 °C (68 °F) and higher have direct use applications such as aquiculture,

therapeutic bathing, melting ice and snow, and heating homes, buildings and greenhouses. All but 4 of the wells and 2 of the hot springs have temperatures that are marginally into the lower limits of direct use.

Lands and Realty

Navigability

On June 14, 2005, the Oregon State Land Board adopted the findings and conclusions of a Division of State Lands report which found that the 174-mile segment of the John Day River from Tumwater Falls (River Mile 10) to Kimberly (River Mile 184), met the federal criteria for navigability designation. To be considered navigable, the river was determined to be navigable by craft used at the time of Oregon statehood in 1859.

As a result of the navigability designation, ownership of the bed and banks of the John Day was claimed by the State of Oregon. Under this claim state ownership applies to land that lies below the mean high water level. This ownership declaration allows public use of the river, generally to the line of ordinary high water, for activities such as fishing and boating. The primary beneficiaries of this ruling are boaters and anglers now able to use areas previously inaccessible on what, in the past, had been considered private land. State ownership also requires permission from the State of Oregon for certain uses of the waterway (for example, the construction or maintenance of a dock, boat ramp, or moorage, or the removal of sand or gravel).

Rights-of-way and Easements

BLM land in the planning area has 249 miles of easements and 129 miles of granted rights-of-way involving roads and utilities. There are six existing utility and transportation corridors in the plan area, as follows: two follow railroads, one follows the gas pipeline, and the remaining three are electric transmission lines. The railroads run north from Condon and along the Columbia River. The gas pipeline crosses the John Day River at Thirty-mile and Pine Hollow. The first electric transmission line runs from Fossil, crosses the John Day River at Cottonwood Bridge, and continues west. The next line runs from South of Grass Valley, crosses the John Day River near river mile 25 and runs toward Arlington. The last line runs just south of the Columbia River, connecting Rufus and Arlington.

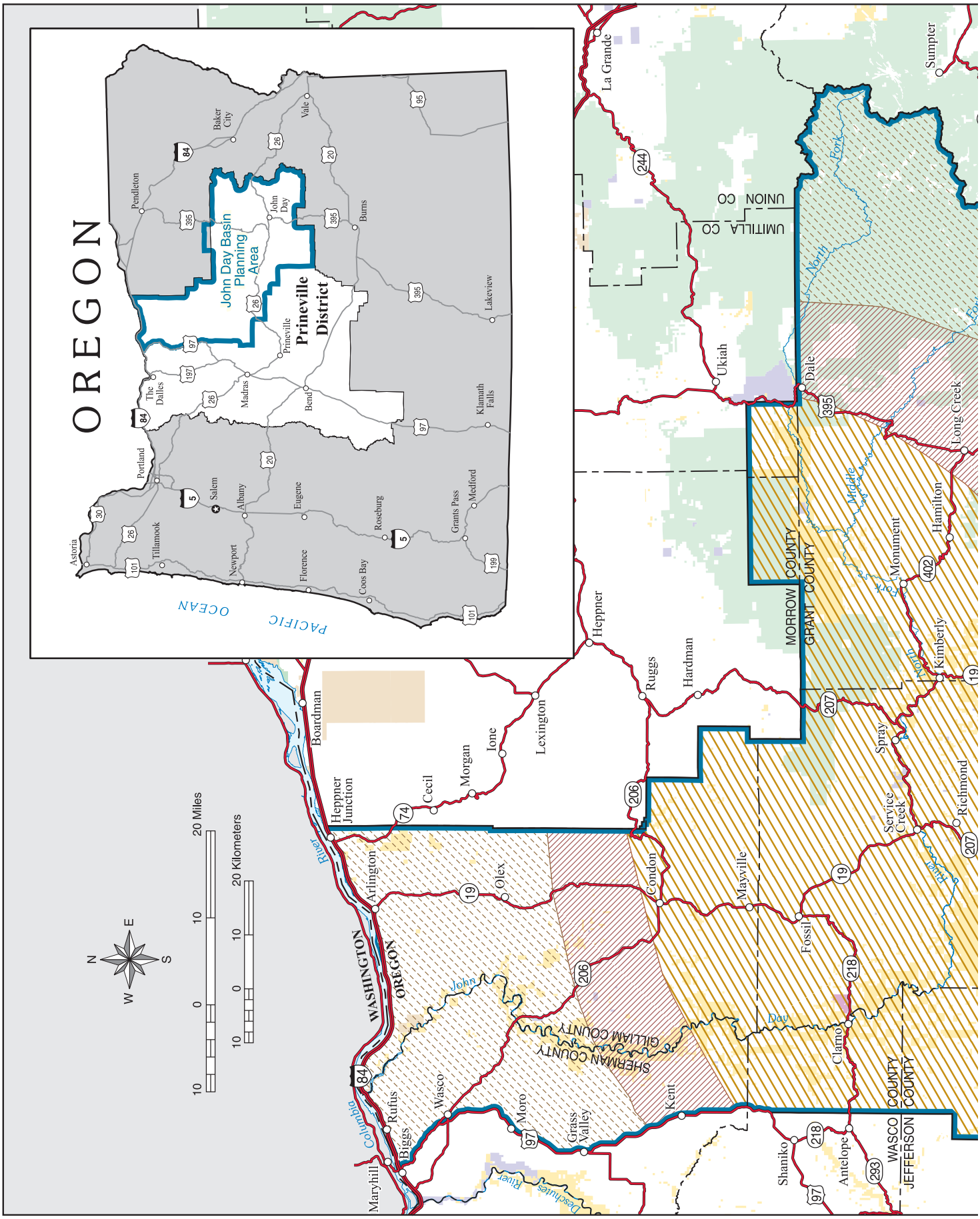
Easements are acquired by the BLM in order to use the land of another for a special purpose or access. Rights-of-way are granted by the BLM to others for various purposes which include easements, leases, permits, or licenses to occupy, use, or traverse public lands. Rights-of-way are authorizations for reservoirs, canals, ditches flumes, laterals, pipes, pipelines, tunnels, and other appurtenances for the storage and distribution of water; pipelines and other systems for the transportation of distribution of liquids and gases other than water or oil; transportation and distribution systems, and storage facilities for solid materials; systems for generation, transmission, and distribution of electric energy; communications systems; roads, highways, trails, and other transportation facilities; and other systems and facilities which are in the public interest.

Withdrawals

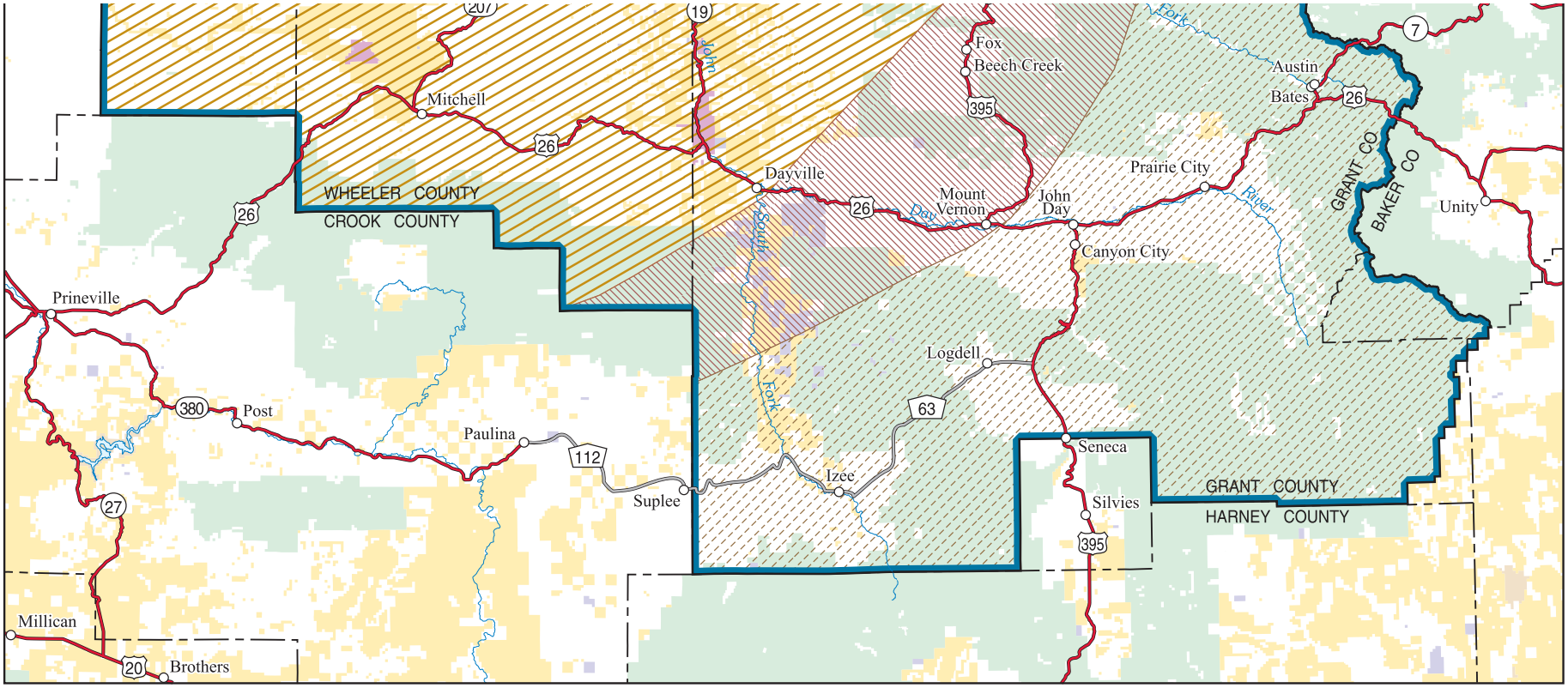
A withdrawal is a management tool used to implement resource management planning prescriptions. Withdrawals also represent a means to transfer administrative jurisdiction from one federal agency to another. In addition they are used to close public lands to some or all of the public land laws or mineral law, or to dedicate land for a specific public purpose. The restrictions generally segregate the lands from some or all of the public land laws and some or all of the mining and mineral leasing laws for a specific period of time. Examples might include a dewatering limiting river flows or a withdrawal might close an area to non-metalliferous mining (cement quality limestone, diatomite etc.), but open to metal mining (gold, silver, mercury etc.).

In the 1960s federal inventories withdrew land along the John Day River anticipating the need for future hydroelectric dam sites.

Currently the John Day Basin has spring, mineral, and power site withdrawals scattered throughout the planning area.



Map 23: Oil and Gas Potential



LEGEND

Oil and Gas Potential

- High
- Moderate
- Low

Planning Area Boundary

Administered Land

- Bureau of Land Management
- Forest Service
- John Day Fossil Beds National Monument
- Other Federal
- State
- Private or Other

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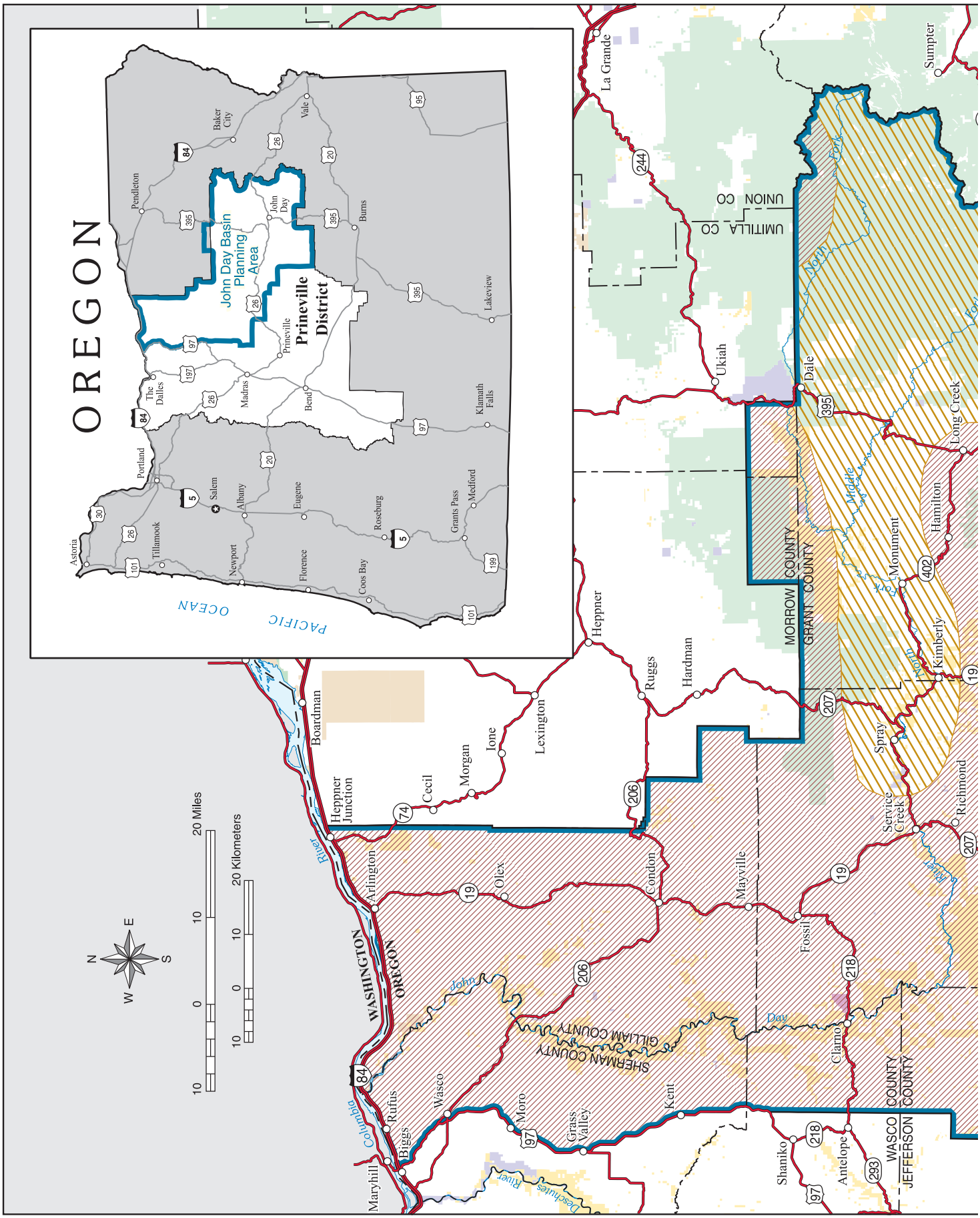
Map 23: Oil and Gas Potential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John Day Basin Planning Area
Prineville District
Pendleton
Baker City
Vale
John Day
Burns
Lakeview
Prineville
Madras
Bend
The Dalles
Klamath Falls
Portland
Salem
Albany
Eugene
Roseburg
Grants Pass
Medford
Astoria
Tillamook
Newport
Florence
Coos Bay
PACIFIC OCEAN
La Grande
Sumpter
UNION CO
UMATILLA CO
Ukiah
Dale
Long Creek
Hamilton
Monument
Kimberly
Heppner
Ruggs
Hardman
MORROW COUNTY
GRANT COUNTY
Boardman
Lexington
Ione
Morgan
Cecil
Heppner Junction
Arlington
Olex
Condon
Mayville
Spray
Service Creek
Richmond
Fossil
Clarno
Antelope
Shaniko
WASHINGTON
OREGON
SHERMAN COUNTY
GILLIAM COUNTY
WASCO COUNTY
JEFFERSON COUNTY
Wasco
Moro
Grass Valley
Kent
Rufus
Biggs
Maryhill
Columbia River
John Day River
North Fork John Day River
Middle Fork John Day River
Deschutes River
N
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E
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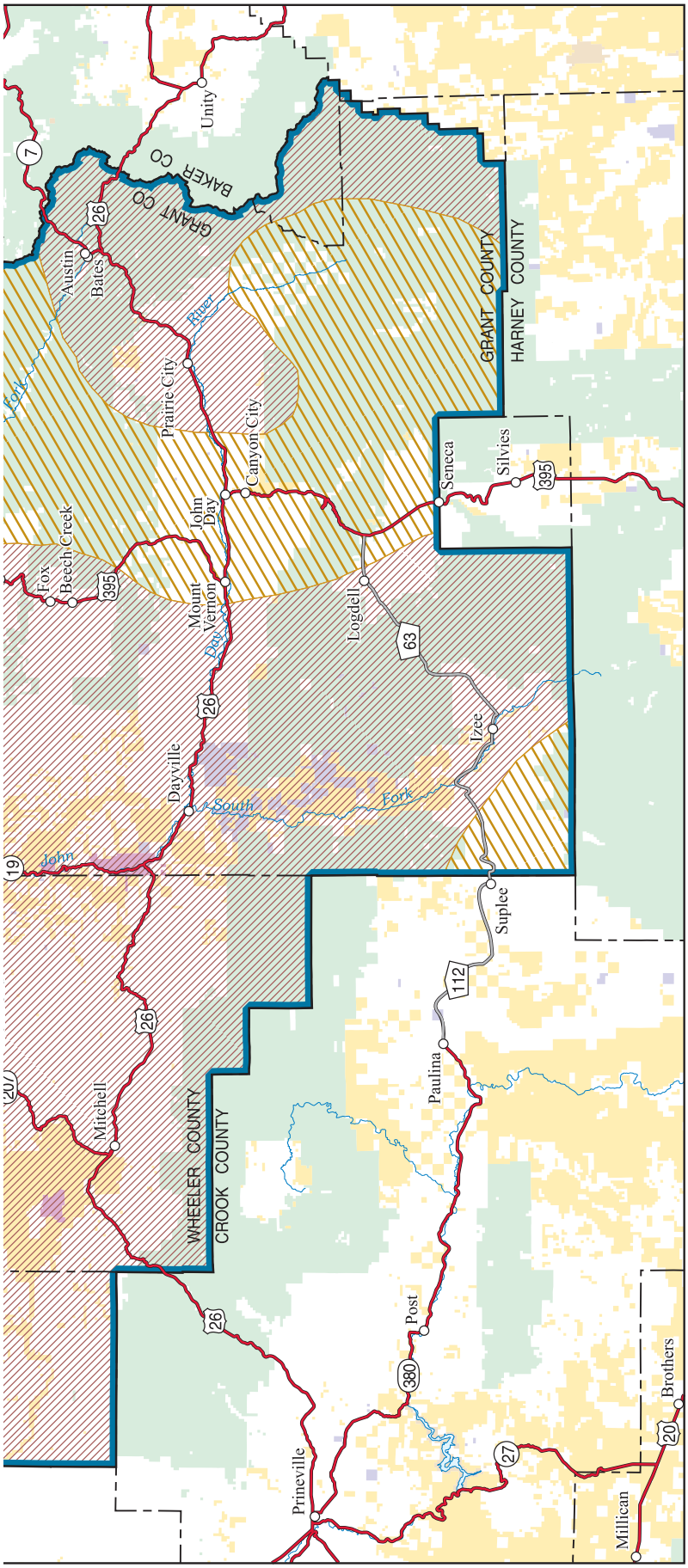
20 Miles
20 Kilometers



LEGEND

Geothermal Potential

- High
- Moderate

- Planning Area Boundary

Administered Land

- Bureau of Land Management
- Forest Service
- John Day Fossil Beds National Monument
- Other Federal
- State
- Private or Other

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Map 24: Geothermal Development Potential

Land Ownership

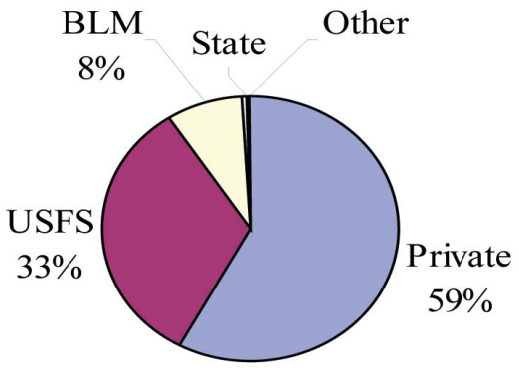
> "People are moving in and staying. They don't need the land to make a living."
> [Gilliam County Resident- JKA, 2006]

The Western landscape is dominated by open spaces broken by numerous plateaus, mountain ranges, occasionally fences and an increasing amount of urban and suburban areas. Historically, urban areas of the west specialized in the acquisition and distribution of products produced from the surrounding farms, ranches, and forests. The larger ranches were slowly divided and our modern transportation system was developed. Many urban centers are now surrounded by suburban areas, which are then bordered by hobby farms adjacent to public lands.

In the John Day Basin planning area this transition from large landownership to a more fragmented ownership pattern has occurred more slowly than in many parts of the west. Many communities maintain a remnant dependency on the surrounding lands and have yet to fully experience the transition to a Western landscape characterized by suburban areas, and small farms surrounding urban areas. Settlement patterns are however changing, as long-time ranches are bought by wealthier urbanites who often purchase for recreation or conservation purposes (Priester *et al.*, 2006).

Ownership across the John Day Basin planning area is dominated by private landholdings which comprise 59 percent of the total 5.4 million acre planning area. USFS and BLM land make up 33 percent and 8 percent of the plan area respectively. State land, Indian Affairs, National Park, and Army Corps of Engineers make up less than 1 percent of plan area ownership (See Map 1 in Chapter 1 and Figure 3-36).

Figure 3-36. Land Ownership in the JDBRMP Area



Source: BLM GIS database, 2006

The southern and eastern portions of the planning area contain a high proportion of public lands managed by the USFS. These areas are characterized by USFS land in the higher elevations and BLM land in the lower elevations and drainages.

Passage of the Oregon Land Exchange Act in 2000 resulted in a land ownership adjustment in Northeast Oregon, primarily in Grant County. In exchange for public lands disposed of in this Act, the BLM acquired approximately 44 thousand acres along the North Fork of the John Day River.

Leases and Permits (Recreation and Public Purposes Act)

Temporary land use permits or leases may be used to authorize such activities as trespass prior to resolution, access, storage, apiary sites, National Guard or military reserve training, engineering feasibility studies, and other miscellaneous short-term activities. In the John Day Basin planning area there are numerous agricultural leases on BLM lands for which fees are not collected.

The Recreation and Public Purposes Act (R&PP) authorizes the sale or lease of BLM managed lands for recreational or public purposes to State and local governments and to qualified nonprofit organizations.

Water Rights

Water is the fundamental resource of the John Day Basin. It enables plants to grow and is essential for wildlife. People need water to drink, for play, and to support a livestock grazing, irrigation, mining and other economic enterprises. Who gets water and when and how they get it are questions that have dominated the west for over a century and a half.

These questions are answered through the allocation of water rights. Surface and ground water are the property of the State and the Oregon Water Resources Department administers the water to those who have a water right.

Water rights are important tools that have allowed BLM to accomplish a wide variety of their multiple use objectives. Water rights can be used to extract minerals, provide wildlife habitat, and preserve aquatic life. The majority of water rights on BLM land are for irrigation. BLM actively manages over 700 acres of the irrigation water rights under the John Day Wild and Scenic River Plan and the Sutton Mountain Coordinated Resource Management Plan. The remaining 1,175 acres of irrigation occur on scattered pieces of agricultural land through out the plan area. Approximately one third of BLM's water rights are related to mining. The majority of the mining water rights are located near John Day, OR on Little Canyon Mountain. This area was hydraulically mined for gold in the late 1800s and early 1900s. Many of the water rights completely overlap each other and include a 200 acre irrigation water right.

BLM has approximately 220 different state administered water rights. BLM actively manages 23 of these. Based on the Oregon Water Resources Department data, between approximately 50 and 70 cfs could be diverted under BLM water rights. This water is scattered across the basin and is not from a single stream channel. The top few sources include the John Day River, Bridge Creek, the North Fork John Day River, Rock Creek, Bear Creek, and Little Pine Creek.

The value of BLM's water rights in the John Day basin is magnified by the fact that the basin water is over allocated (more water rights than water available) for a large portion of the year.

The monthly water availability is provided in Figure 3-37.

Most water use requires that water be diverted from the river. BLM land within the John Day Basin contains both points of diversions and places of use for state appropriative water rights.

Less than half of BLM owned points of diversions supply only BLM lands (see Figure 3-38). Rights of way are required for most conveyances of water across BLM land. On the ground conditions are continually changing and water users continually ask to upgrade, move, and change the construction of water transportation and diversion facilities. These require rights of ways when they cross BLM land. The interconnected nature of these water rights indicates the importance of cooperative management to this key resource.

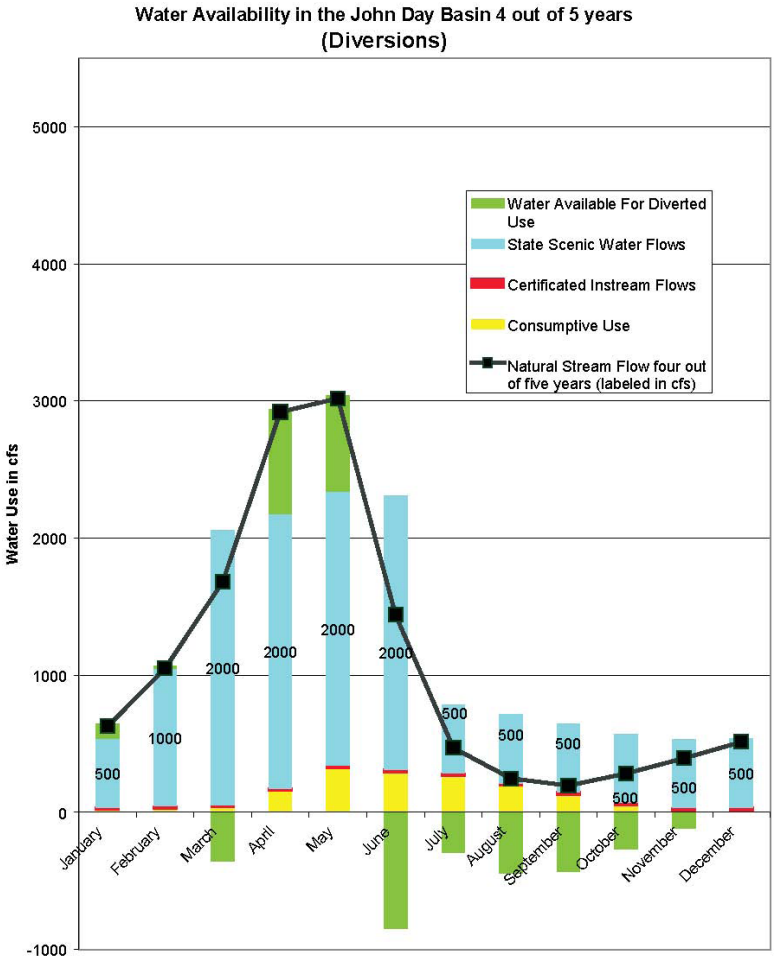
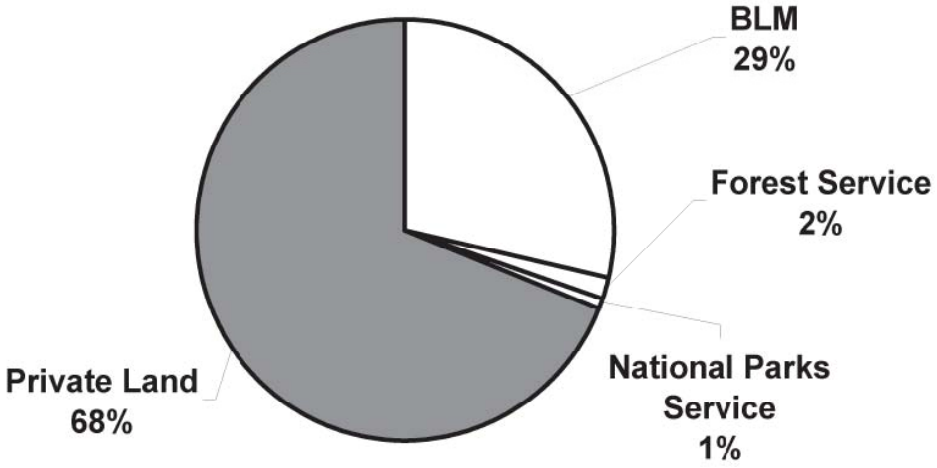


Figure 3-37. Water Availability in the John Day Basin 4 out of 5 Years

Figure 3-38. Percent Ownership of Lands supplied Water from BLM Owned Points of Diversion



Many of the BLM ponds and springs may also be federally reserved water rights under PWR107, an executive order made by Calvin Coolidge in 1926. This order withdrew every smallest legal subdivision of the public land surveys and all lands within one quarter mile of important springs and waterholes on unsurveyed lands. The primary purpose of this withdrawal was for current or future livestock watering and human consumption. This withdrawal includes springs and waterholes on land that was vacant, unappropriated and unreserved as of April 17, 1926. This constitutes a Federal Reserve right with a 1926 priority date. Springs and waterholes do not need to be currently inventoried in order to qualify, but it is useful to have the inventory completed to ensure that the water right is appropriately tracked during land tenure adjustments. Inventories of ponds and springs are incomplete at this time. Some ponds and springs have been issued permits, applications, or certificates from the State of Oregon, but many have not.

Wind Energy

Leases for the development of Wind Energy are managed under the Lands and Realty program. Plan Area wind energy potential is greatest north of Cottonwood Bridge, and increases toward the Columbia River. Factors contributing to increased wind energy potential include:

- Slopes less than 20%
- Unforested areas
- Areas within 25 miles of existing transmission lines
- Areas away from water bodies

Changes in energy markets make predicting wind energy demand impractical. Decisions to invest in wind energy are dependent on the cost of alternative sources of energy, as well as the regulatory environment and other external costs to society. The commercial viability of wind power also depends on the pricing regime for power producers. The cost of wind energy production has fallen rapidly since the early 1980s, primarily due to technological improvements. As technology and the ability to forecast improves and the scale of production increases further cost reductions can be expected (Woodin, 2005 and Williams, 2006).

Chapter 4
Environmental Consequences

Introduction

In accordance with NEPA, this chapter describes the direct, indirect, and cumulative environmental consequences of the land management alternatives described in Chapter 2 on the affected environment described in Chapter 3. The following environmental consequences are described by resource or resource use. Key indicators are used to assess the direct and indirect effects of management alternatives and are described for each resource or resource use. Assumptions common to all analyses are described first; assumptions that are more specific are described in the following sections.

Analytical Assumptions

The following key assumptions are common to all alternatives.

Planning Time Horizon

The environmental and social effects of resource management or resource use extend across long and short term planning horizons. For the purposes of these analyses, “long-term” is considered to be about 50-100 years, and “short-term” is considered to be about 10-30 years. “Temporary” is considered to be less than 5 years and preferably less than 2 years.

Current Plans for Public and Private Lands

For purposes of this analysis, it is assumed that other federal and state agencies would continue to implement their current plans as written. Since private, industrial and non-industrial lands are owned by a variety of individuals and entities, we did not attempt to predict the various scenarios that could occur on adjacent lands across space and time. It is assumed that private lands would continue to provide the same overall amount and spatial pattern of vegetation, habitat and disturbance over time as presently exists.

BLM Budget

It is assumed that all alternatives would be adequately funded to implement them as designed and described in Chapter 2. However, some effects analysis utilizes historic activity levels as a constant for comparing alternatives.

Threatened and Endangered Species

It is assumed that the current listing status for species under the Endangered Species Act would remain in effect. Additionally, since BLM manages candidate species similar to listed species (to avoid contributing to the need to list them), then any future listing would have little measurable effect on the BLM’s management approach. Analysis of RMP impacts on a particular species would remain relevant or conservative regardless of any future listing or delisting action.

Natural Disturbances

This analysis does not include estimates of future natural disturbances except in the case of potential future stand replacement wildfire disturbance, in some instances. It is assumed that wildfires, windstorms, disease, insect infestations, and subsequent resource salvaging would occur in the future under all five alternatives. While the alternatives may result in differences in the landscape effects of natural disturbances, the specific location, timing, severity, and extent of such disturbances are not predicable at the scale of the plan area.

Data, Methods, and Models

Assessments of the effects of the alternatives are both quantitative and qualitative in nature, and consist of procedures, models or information from professional sources.

A Geographic Information System (GIS) database was used to analyze the environmental consequences of the alternatives. This database includes information on such things as vegetation, management units, roads, hydrology, soils, elevation, ownership, wildlife habitat, energy, minerals, and noxious weeds. The GIS data provides the locations of the important features and their attributes that relate to the lands and the relevant decisions of this planning effort. The John Day River Basin Resource Management Plan interdisciplinary team worked with a team of GIS specialists and created a spreadsheet that recorded both geospatial data and analytical requirements. Based on defined requirements, the relevant geospatial data was reviewed, updated and organized, much of which has been placed into a central geospatial database. Metadata for each theme was created. Metadata is information that explains the source, history, attributes and individuals responsible for each of the data used in the DEIS/RMP. The database was used by GIS analysts located both in the BLM Prineville District as well as in the BLM Oregon State Office in Portland. The data was used to create the analyses and the maps in the DEIS/RMP. The GIS team automated the geospatial analytical processes and generated the acreage summaries by resources issues, alternatives and category. The Bureau is a member of the Department-wide site license for ESRI's GeoProcessor software, and ArcMap version 9.2 was used to complete the analyses. This data is available to the public upon request.

The WEPP model is a computer program that describes the processes that lead to erosion. A subset of this model "The WEPP Forest Road Erosion Predictor" was used to estimate erosion and sediment delivery from the JDRMP plan area road network. Model input parameters include road design, road surface, traffic level, road gradient, road length, road width, fill gradient, fill length, buffer gradient, buffer length, rock fragment percent, soil texture, and climate. These input factors are estimated for each segment of road and the model is run for 30 years using a climate representative of the road segment area. Outputs for each road segment include the average annual sediment leaving a road segment and average sediment leaving a buffer. The sediment outputs were summarized and totaled by road designation and stream crossings. These summaries were used for comparing alternatives.

Road banding was used to analyze the effects of roads on wildlife habitat. The methodology utilized Arc GIS 9.2 to buffer open roads by six concentric distances of 394 yards each. Resultant buffers formed bands of varying distances from open roads: band 1 = 0-394 yards, band 2 = 395-788 yards, band 3 = 789-1182 yards, band 4 = 1183-1576 yards, band 5 = 1576-1970 yards, and band 6 = 1971-2364 yards.

Social and Economic Analysis Methods and Issues

Social and economic analyses included in the DEIS consist of eight central Oregon counties: Gilliam, Grant, Jefferson, Morrow, Sherman, Umatilla, Wasco and Wheeler.

Potential economic impacts were assessed using the Forest Economic Analysis Spreadsheet Tool (FEAST) developed by the USDA Forest Service Inventory and Monitoring Institute (IMI) in Fort Collins, Colorado. This tool uses a Microsoft Excel workbook as an interface between user inputs and data generated using the IMPLAN input-output modeling system. For additional information on social and economic analysis methods, see Appendix R.

Biomass opportunities may exist, but are not analyzed given a lack of understanding of obstacles to implementation and impracticalities of projecting future scenarios for implementation.
Potential impacts on non-market values, including natural amenities and quality of life, non-use values, and ecosystem services, are assessed in qualitative terms, as appropriate.

Other Effects

Cumulative effects result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). Some environmental effects described in this draft environmental impact statement have incremental impacts that result in cumulative effects on a particular resource of concern. The discussion of effects on each resource in this chapter incorporates cumulative effects. Baseline information on existing conditions is the aggregate result of all past actions and previous land use plans (as described in Chapter 3); therefore, this chapter does not individually analyze these past actions.

For public lands, reasonably foreseeable future actions are those that would occur under current or proposed land use plans. For private lands, reasonably foreseeable future actions are those actions that would occur with the continuation of present management at current trends or those allowable under state and local laws and regulations.

Mitigation

The Council of Environmental Quality's regulations state that mitigation includes avoiding, minimizing, rectifying, reducing, eliminating, or compensating for adverse environmental impacts. Measures used in mitigating effects from management activities are included in the design of the alternatives, and therefore assessed as part of the effects of alternatives.

Summary of Environmental Consequences

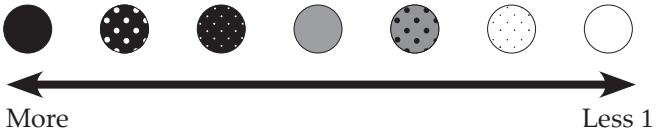
Table 4-1 synthesizes environmental consequences (including social, economic, and ecological) by resource or resource use. It qualitatively compares how the alternatives meet the long term goal of developing management practices that ensure long-term sustainability of a healthy and productive landscape, and add to community stability through resource use and enjoyment, as described in Chapter 1.

Tables 2-24 and 4-1 display the overall key effects between alternatives. Relative rankings in Table 4-1 are based on the comparative net differences in effects of the management alternatives on each specified resource or resource use. Some effects of alternative actions meet the purpose and need to varying degrees. These differences add-up to an overall net effect. For example, reducing social and ecological conflicts between livestock grazing and other uses can be may also result in an economic effect due to lower availability of AUMs if allotments must be closed as a result. Similarly, increasing the amount of transportation system roads may increase public access to BLM lands, but it can also increase road maintenance. Table 4-1 displays net effects of the alternatives considering these differences. Examples of indicators that differ in their outcomes across alternatives are also displayed. Detailed analyses of effects are described later in this Chapter.

It is difficult to address all needs across a broad range of resource values and land uses. Each of the alternatives involves compromise; however, Alternative 2 is preferred over the other alternatives because overall, it best meets the purpose and need for a revised plan, as described in Chapter 1. Alternative 2 is as good as, or better than other alternatives at addressing resource issues. The possible exception is recreation, where the availability of off-road vehicle travel routes are greater in Alternative 3.

Table 4-1. Synthesis of environmental consequences (including social, economic, and ecological) of management alternatives on resources and resource uses in the John Day River Basin plan area.

To what relative degree do the alternatives meet the purpose and need, significant issues and management concerns, as described in Chapter 1?



Issue 1: Landscape Health.
Would the plan achieve healthy plant and animal communities? Would the plan allow fire to play its ecological role while helping to ensure public safety from wildfire?

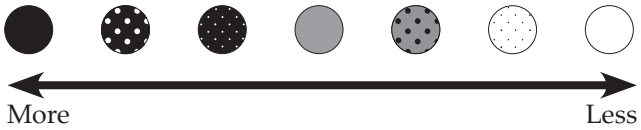
Resource or Resource Use	Examples of indicators that show differences in effects between alternatives.*	Alternative				
		1	2	3	4	5
Vegetation	Difference between current ecosystem conditions and the Acceptable Range of Variability (ARV).					
Fire and Fuels	Wildfire risk to communities at the wildland urban interface.					
Aquatic Resources	Difference between current and proper functioning conditions.					
Wildlife	Security habitat.					

Issue 2: Access and Travel Management.
Would the plan result in a road system that would efficiently deliver goods, people, and services across the plan area? Would the plan provide for motorized and non-motorized recreation, while protecting natural and cultural resources?

Access & Travel	Access to public lands. Road maintenance costs					
Recreation	Availability of OHV routes and Open areas. Conflicts between OHV and other uses.					

Table 4-1 (continued). Synthesis of environmental consequences (including social, economic, and ecological) of management alternatives on resources and resource uses in the John Day River Basin plan area.

To what relative degree do the alternatives meet the purpose and need, significant issues and management concerns, as described in Chapter 1?



Issue 3: North Fork of the John Day River
Does the plan protect native fish, wildlife habitat, and public recreation on newly acquired and adjacent BLM lands along the North Fork John Day River?

Resource or Resource Use	Examples of indicators that show differences in effects between alternatives.*	Alternative				
		1	2	3	4	5
Wild & Scenic Rivers	Outstandingly Remarkable Values (ORVs).					
Other Management Concerns*						
Social and Economic Values	Employment and labor income.					
Soils	Erosion.					
Wilderness Characteristics	Maintenance of wilderness qualities.					
Wilderness Study Areas	Degree of protection of wilderness values.					
Visual Resources	Visual quality.					
Caves	Degree of habitat protection.					
Livestock Grazing	Available AUMs. Conflicts with other uses or ecological values.					

* Management of the following concerns vary none or little in their effects across alternatives: Air Quality, Noxious Weeds, Wild Horses, Areas of Critical Environmental Concern, Byways, Native American Values, Paleontology, Cultural Values, Lands and Realty, Agriculture Management, and Minerals and Energy.

Resource Uses Not Affected by the Alternatives

The following resource uses are not anticipated to be appreciably affected by alternatives for other resources or resource uses: Areas of Critical Environmental Concern, Byways, Lands and Realty, Agriculture Management, and Hazardous Materials Management.However, the environmental consequences of these resource uses on other resources is analyzed in the following section.

Analyses of Environmental Consequences by Resource or Resource Use

Soils

Analysis of the environmental consequences of the alternatives on soils considered the following key resources or resource uses: motorized and non-motorized recreation, transportation management, vegetation manipulation, livestock grazing, wildlife, fire management and energy and minerals.

Indicators used to compare environmental consequences between alternatives include: acres of treatments with potential to detrimentally damage soils, soil erosion (e.g., tons of soil eroding using Water Erosion Prediction Project (WEPP) road model outputs), acres of sensitive soils, and acres treated on sensitive soils.

Soil Indicators

- 1 **Area (acres) of treatments with potential to detrimentally damage soils.** A detrimentally impacted soil will likely not recover to a native perennial vegetation cover within 2 years following an impact disturbance.
- **Acres of surface disturbing activities and treatments on sensitive soils.** Ground disturbance on soils highly vulnerable to erosion can be more detrimental in a shorter period of time than in areas identified as moderately or not vulnerable to erosion.
- **Soil erosion (tons of soil eroded).** Soil erosion is the displacement of soil from the earth's surface. Some rates of soil erosion are part of landscape evolution. Soil erosion referenced in this document is at rates and scales beyond those associated with natural soil erosion. Compacted or displaced soils are more susceptible to erosion.
- **Soil productivity.** Soil productivity is the ability of soil to grow plants. Soil productivity is an indicator of how well management would attain land use plan objectives for soils. Coarse wood in forest and woodland sites is essential to long term carbon storage and soil productivity. Healthy stands of native bunch grass are good for maintaining and replenishing organic matter necessary for rangeland soil productivity.
- 1 **Soil function.** Soil function is the capacity of soil to 1) sustain life, diversity, and productivity; 2) regulate and partition water and solute flow; 3) filter, buffer, degrade, and detoxify potential pollutants; and 4) store and cycle nutrients. Soil function is reduced in compacted soils. Reduced soil function in compacted soils is related to reduced pore space, less biologic activity, increased water runoff and loss of organic material. Macrobiotic crusts store and cycle nutrients in soil.

Soil Assumptions

- 1 Under extreme weather conditions, wildfire will burn heavy coarse fuel loads (tree canopy cover greater than 40%) hot enough to detrimentally impact the soil (USGS 2007).
- 1 The longer an area is in a detrimentally impacted condition without protective soil cover, the greater the potential for increased erosion, loss of soil productivity, and decreased soil function.
- 1 Open OHV designations with high intensity use will decrease soil productivity and long term soil function.
- 1 The additive effect of repeated treatments on a forested site can compact soils.
- 1 All alternatives will implement soil BMPs.
- 1 Relative to soil function, sites in early seral condition are generally in 'poor' ecological condition and prone to invasion from weeds and annual grasses. Late seral condition sites are generally in 'good' ecological condition and are not currently prone to invasion from weeds and annual grasses. Mid seral condition sites fall in between.

Analysis of the Effects of the Alternatives on Soils

Soils Management Effects on Soils

Soil restoration actions include seeding, planting, subsoiling, lopping and scattering cut vegetation, and other actions. Applying restoration treatments improve vegetative soil cover, increase biologic activity in soil, decompact soils, and restore soil function. Soil restoration actions in upland areas ensure a less than 10% probability of unnatural soil erosion. Alternative 1 and Alternatives 2-5 prescribe actions to restore erosive conditions, but only Alternatives 2-5 prescribe actions to restore soil productivity and soil function. All alternatives will conserve soil productivity and function by avoiding disturbance that requires restoration.

Guidelines provide specific limits and criteria for soil management. Guidelines under Alternatives 2-5 limit and restore areas of detrimental soil impacts, retain large wood, and prescribe grazing that increases biological soil activity. These actions reduce the amount of detrimentally impacted soils, contribute organic matter for soil function, and improve soil productivity, respectively. There are no guidelines for the amount detrimental soil impact, large wood retained, or grazing prescriptions, under Alternative 1. Therefore, soil management under Alternatives 2-5 improve overall soil function more than Alternative 1.

Some soils guidelines provide limits and criteria specific to soils near facilities. Implementing, maintaining and restoring proper drainage and erosion control on all existing facilities reduces erosion from and around those facilities. Trading the expansion of soil disturbance area associated with new facilities for proportional rehabilitation, decommissioning, or obliteration of other disturbed areas maintains a constant area of soil disturbed by facilities (eg. roads, trails, campsites, landings, etc.). The existing area of soils disturbed by facilities would be reduced or maintained through trades. Requiring a change in road maintenance intensity to a level where excess erosion is verified and controlled systematically would eliminate excess erosion (6 inch ruts) across the entire road network. Management of soils near facilities results in less erosion and less area disturbed by facilities under Alternatives 2-5 than Alternative 1.

Soils BMPs minimize erosion initiated by other resources or resource uses. The amount of erosion reduced by the utilization and effect of BMPs would be approximately the same under Alternative 1 and Alternatives 2-5.

Non-Motorized Recreation Effects on Soils

Recreation management of the plan area is divided into Primitive, Back Country, Middle Country, Front Country, Rural and Urban settings. Non-motorized recreation is emphasized in Primitive and Back Country settings, but is available under all recreation settings. Non-motorized activities include hiking, mountain biking, horseback riding, hunting, camping and similar uses. Non-motorized activities can occur on designated sites or may be dispersed across the landscape.

Public use at designated sites often removes vegetative soil cover and compacts the soil surface (Beardsley and Wagar 1971; Cull *et al.* 1981). Loss of soil cover decreases soil productivity and may increase erosion. Compaction of soils also decreases soil function. In this plan, designated sites for hiking, camping and mountain biking would generate detrimental soil impacts that are similar for all action alternatives.

The desire for non-motorized recreation, other than river rafting, is very light in the plan area. As a result there are very few designated sites for non-motorized recreation. All alternatives continue the designated camp sites along the river corridors and on designated trails. The action alternatives include proposals for new developed sites in Dixie Creek and the North Fork John Day River. The Dixie Creek area would include an emphasis on mountain bike trail network which would be prone to erosion and compaction. Designated campgrounds proposed for the North Fork of the John Day would shift camping away from the river. This shift would reduce compaction and erosion of the riparian soils along the river. Subsequent erosion and compaction at the developed camp sites would be minimized through the use of BMPs. Prudent monitoring and on- site enforcement of the proposed campgrounds and mountain bike trails would minimize erosion and compaction associated with these activities.

Guidelines for trading expansion of new developed sites with proportional rehabilitation, decommissioning, or obliteration of existing disturbed areas will maintain or decrease current acres disturbed across all alternatives.

Under all alternatives, most non-motorized recreation opportunities would continue to be dominated by dispersed use and cause limited compaction and erosion. Dispersed recreation may create scattered trails. Trails that occur on steep slopes or concentrate use over a large area, can lead to soil compaction and erosion. Sediment eroded from trails is often deposited directly into small streams. This excess sediment may increase erosion and transport rates of alluvial soils and cause gullies along small streams. However, across the plan area, the non-motorized recreation is light. This light level is expected to continue and result in minimal erosion under all alternatives.

Motorized Recreation Effects on Soils

Motorized recreation is part of the recreation setting in the portions of the plan area allocated as Middle Country, Font Country, Rural, and Urban. Approximately 80% of the plan area is available for motorized recreation under Alternatives 2-5 and approximately 85% of the plan area is available under Alternative 1, based on OHV designations of Open and Limited.

Motorized recreation includes the use of several types of Off Highway Vehicles (OHVs) such as: motorcycles, "quads," and full-sized 4-wheel drive and passenger vehicles. OHVs have some effects on soils that are slightly different than highway travel. With OHVs, speed is often a factor. OHV use often entails spinning wheels, high speed turns, hard acceleration, hill climbing and travel. When this use occurs during very wet or very dry unimproved trails or native soils, it can cause accelerated erosion, soil displacement and compaction. With increased motorized recreational activity, acres of surface disturbing activities, erosion and compaction would increase while soil productivity and biological soil activity would decline. The use of OHVs is allowed in areas designated as either Open or Limited to designated roads and trails. In Closed areas OHV use is prohibited, except for limited administrative use.

Areas designated as Open for OHV use allow cross-country travel without use restrictions. Over time, repeated use of cross-country paths by motorized recreationists and travelers, particularly near population centers, results in the creation roads/trails on public and private lands. Cross country OHV use spreads weeds that may alter soil characteristics such as fire regimes, biologic community, and soil chemistry. Even light soil surface disturbance from OHV use can disrupt growth of macrobiotic crusts which are important for nutrient processing and soil function. Alterations in soil characteristics can decrease soil productivity. All these possible effects to soils would exist and continue under alternatives which designate Little Canyon Mountain for OHV use. Alternative 1 designates more than half the BLM lands Open for OHV use. Only Wilderness Study Areas or other special management use areas are not designated as Open. Alternatives 2 and 3 designate Open OHV use on less than 1% of the BLM lands. Alternatives 4 and 5 contain the least amount of Open OHV use. Therefore, accelerated erosion, compaction, soil displacement, and loss of soil function due to Open OHV use ranges from greatest under Alternative 1, much less under Alternatives 2-3 and least under Alternatives 4-5.

Areas designated as limited to roads and trails identify paths for various types of uses. In general, motorized use paths remove vegetative soil cover, weakens macrobiotic crusts and compact soils. Loss of cover increases erosion and compaction decreases soil function. Closure and rehabilitation of hill climbs and paths with gullies reduce erosion and improves soil function. In general, motorized use paths and the subsequent loss of soils function are greatest under Alternative 3, less under Alternative 1, and least under Alternatives 2, 4, and 5.

The use of BMPs when designating and designing the trail system under the Limited OHV designation reduces the amount of erosion and compaction that would occur under user created trails. Improved trail design encourages compliance by providing a desirable riding experience. This reduces the probability that a user created trail would result in detrimental soil impacts. Directional signs and numbering of major roads/trails encourages users to stay on designated routes and navigate more efficiently. Monitoring and enforcement of trail systems improves compliance and reduces off trail use. Compliance with use of designated trails and use of BMPs is essential for minimizing erosion and loss of soil function from poorly designed trails. Alternative 1 does not contain standards for OHV trail design, desirable routing or designation criteria. Under Alternatives 2-5, designated trails are selected to meet Soils objectives, are designed with soils BMPs, and provide an efficient and desirable riding experience. As a result, the erosion, compaction and area of detrimental soil impact from Limited OHV designations would be much less under Alternatives 2-5 than Alternative 1.

OHV numbers and pressure for their use is increasing throughout the plan area. There is more OHV pressure around population centers. Considering all of the fuels and vegetation treatment needs, new routes created by

thinning woodlands could create new opportunities for OHV travel off of planned designated routes creating possible new unintended erosion and sedimentation effects. Increased compaction from ground based vegetation treatments would add intensity to flashy runoff into drainages further destabilizing riparian communities.

Due to the combination of OHV closures proposed by the Forest Service in adjacent lands in the plan area, closures on private lands, and BLM closures in the action alternatives, cross country OHV users may concentrate their use in the small designated Open areas proposed under Alternatives 2-3 (Rudio Mountain, the Golden Triangle, and Little Canyon Mountain). By concentrating use, soil productivity loss in those areas may be greater than under either the broad Open areas of Alternative 1 or the mostly Limited designations of Alternatives 4-5. However, providing Open areas under Alternatives 2-3 may improve compliance with designated trail systems, thereby maintaining or improving soil productivity across the remainder of the plan area.

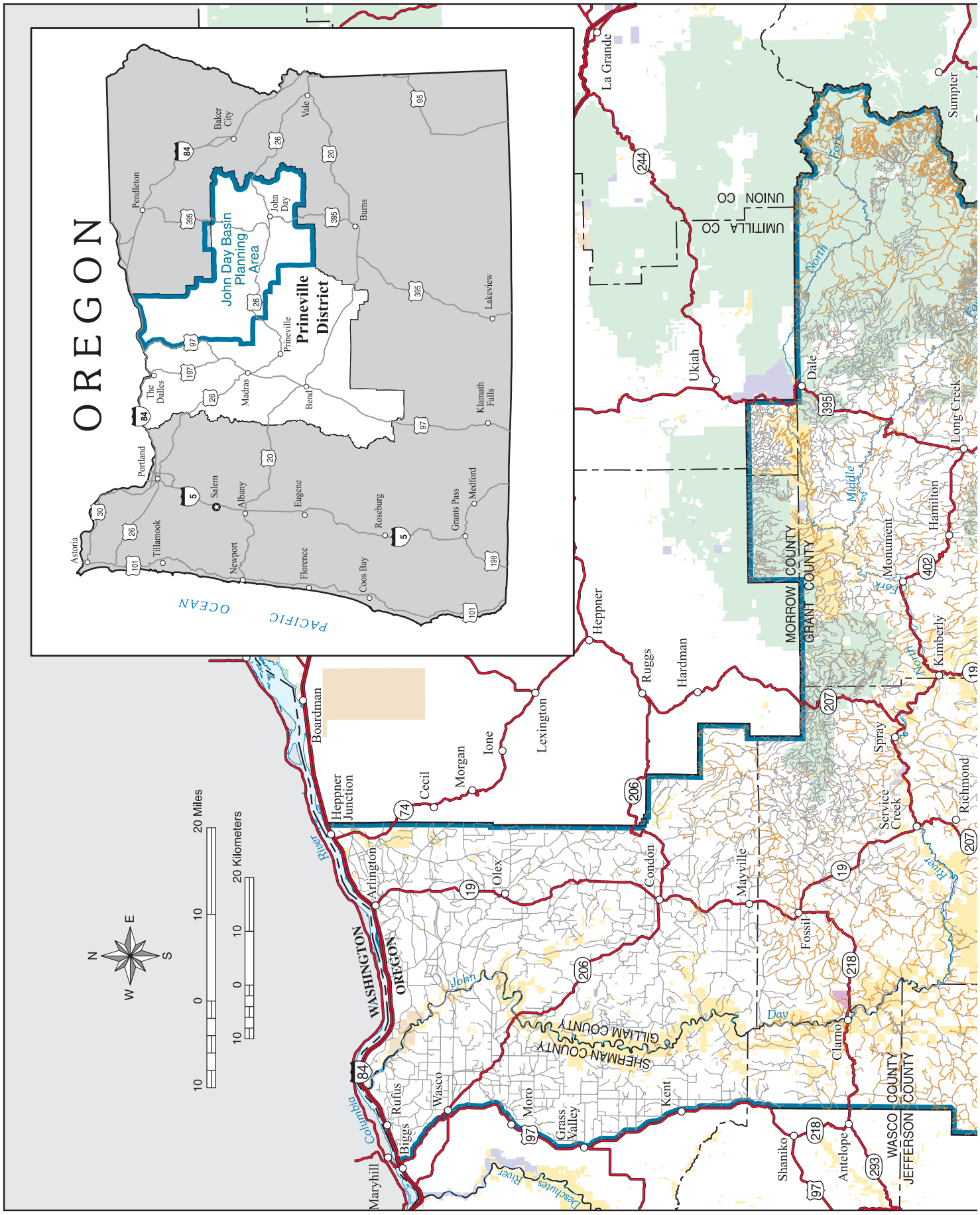
A form of recreation that is becoming more common in isolated spots of the plan area is Class II motorized rock crawling. Rock crawling occurs on bedrock, where there is little soil. The lichens and moss growing on the rock, and plants growing out of cracks in the rock could be eliminated, especially with increased use. The soils at the base of a climb, staging areas, flat benches or summits would be affected similar to the soils affected by transportation management. Areas open to rock crawling are much greater in Alternative 1 than Alternatives 2-5. Alternatives 2-5 simply designate the isolated areas which are already being used for rock crawling. Therefore, there are very few differences between the Alternatives in this aspect.

Transportation Management Effects on Soils

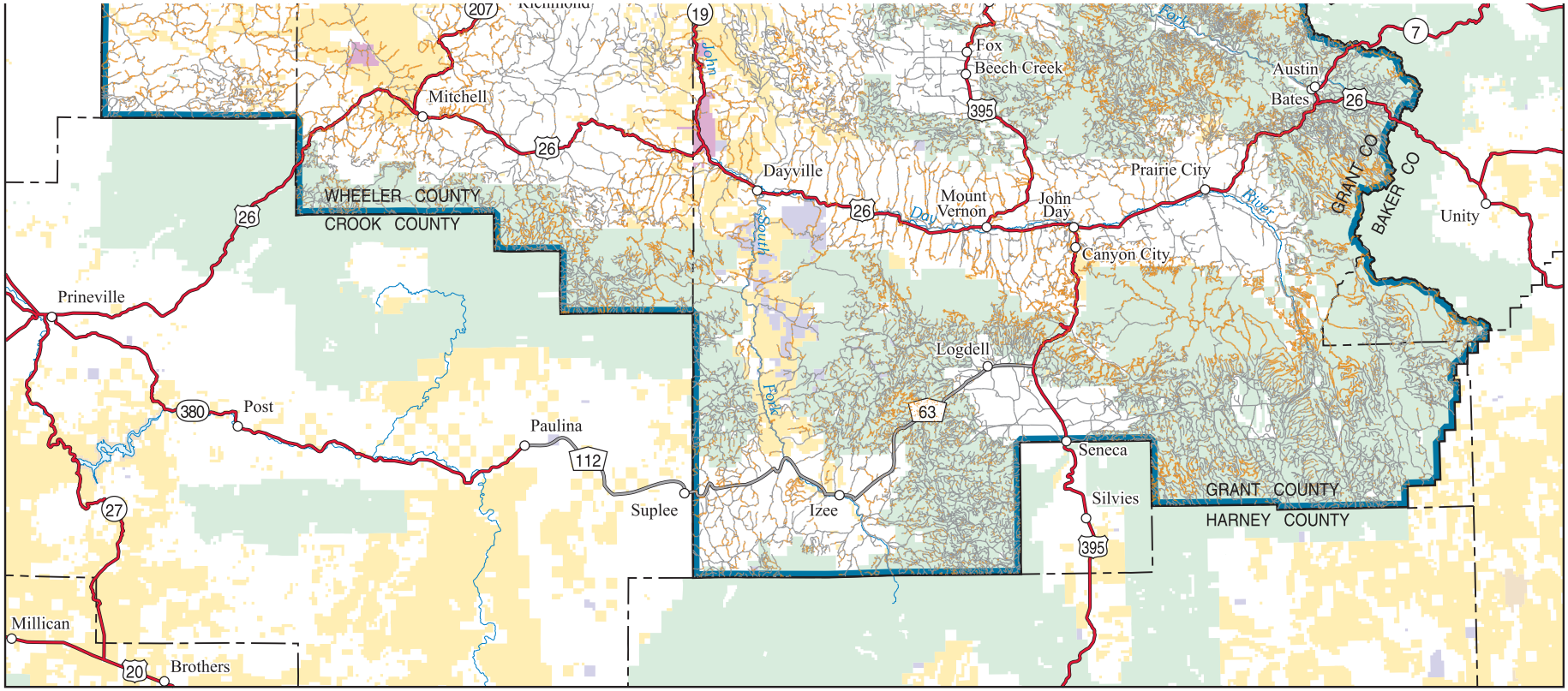
The transportation system has two basic effects on the soil resource. First, it takes land out of vegetation production. Once a road has been constructed, the site has lost much of its soil productivity (potential to grow vegetation). The cut-slopes and road tread lose potential to grow vegetation due to loss of topsoil and compaction respectively, while fill slopes retain some potential for reestablishing vegetation cover.
The second effect is the impact of the road on erosion over time. Roads are major collectors and funnels of water. Rock-surfaced roads produce little sediment over time and are easily maintained. Well designed rock-surfaced roads tend to produce less sediment than natural surfaced roads or paved roads. Paved surface roads erode very little from their paved surface, but the smooth paved surface increases water velocities, which erode soils from the ditches and road shoulders. Natural surfaced roads composed of native soil material are responsible for most of the sediment that leaves the road system. Under all alternatives, the majority of roads in the John Day RMP plan area are native surfaced local roads. Map 25 displays those roads with a high probability of being subject to an excess rate of erosion.

Table 4-3 summarizes the direct, indirect, and cumulative effects of the transportation alternatives on soils. Erosion rates are indicated by average annual sediment yield and alternatives were modeled by Water Erosion Prediction Project (WEPP). Erosion from the BLM transportation network would be 70% lower under Alternatives 2, 4 and 5 than Alternative 3. This difference is due to hydrologic road closures, year round road closures in the North Fork John Day River area, and planned road rehabilitation. The roads identified for closure and rehabilitation for any alternative are for BLM managed roads only. Routes designated as open in Alternative 1 are changed to interim designations in Alternatives 2-5.

Cumulatively, erosion from roads in the plan area would be highest under Alternative 3. Alternative 3 would result in 1% less plan area erosion than Alternative 1. Alternatives 2, 4 and 5 would result in 3% less than Alternative 1 (modeled erosion values are displayed in Table 4-2). New roads constructed under all alternatives are designed to meet BMPs and to prevent unacceptable soil erosion and gullying.



Map 25: Transportation Erosion Estimates



LEGEND

Road With High Probability of Excess Erosion

Road

*Note: Roads with a high probability of excess erosion have an average erosion rate of greater than 0.75 pounds of sediment eroding per linear foot of road. These roads require a change in road maintenance level; options include closure, improved design, or more frequent maintenance.

Planning Area Boundary

Administered Land

Bureau of Land Management

Forest Service

John Day Fossil Beds National Monument

Other Federal

State

Private or Other

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

PRINEVILLE DISTRICT

John Day Basin
Resource Management Plan
Draft Environmental Impact Statement

2008

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Map 25: Transportation Erosion Estimates

Table 4-2. WEPP Sediment Yield by Alternative.
Annual Tons of Sediment Produced from the Transportation Network by Alternative
(Negative numbers indicate erosion eliminated, not totaled)

Road Designation	Alt 1 Sediment (tons/year)	Alt 2 Sediment (tons/year)	Alt 3 Sediment (tons/year)	Alt 4 Sediment (tons/year)	Alt 5 Sediment (tons/year)
Closed Seasonally Other	1.47	1.47	1.47	1.47	1.47
County Road	1,112.23	1,112.23	1,112.23	1,112.23	1,112.23
County seasonally closed for wildlife	6.85	6.85	6.85	6.85	6.85
Forest Service Primary	1,078.35	1,078.35	1,078.35	1,078.35	1,078.35
Forest Service Secondary	10,863.07	10,863.07	10,863.07	10,863.07	10,863.07
Interstate	26.99	26.99	26.99	26.99	26.99
Private	8,756.53	8,756.53	8,756.53	8,756.53	8,756.53
State Highway	296.55	296.55	296.55	296.55	296.55
US Highway	253.97	253.97	253.97	253.97	253.97
BLM Closed Hydro	-1.45	-54.83	-54.83	-54.83	-54.83
BLM Closed Seasonally Rehab	0	6.95	6.95	6.95	6.95
BLM Closed Seasonally Wildlife	52.23	143.2	342.56	143.2	143.2
BLM Closed Wilderness Study Area	-150.12	-150.34	-150.34	-150.34	-150.34
BLM Closed Year-round	-239.59	-742.93	-1.72	-742.93	-742.93
BLM Interim Rehab	0	-2.4	-2.4	-2.4	-2.4
BLM Interim Road	796.76	139.5	681.35	139.5	139.5
BLM Not Designated	4.68	0	0	0	0
BLM Proposed New Road	0	4.68	4.68	4.68	4.68
Subtotal Tons of Sediment (BLM only)	854	294	1,036	294	294
Total Tons of Sediment (Cumulative)	23,250	22,690	23,432	22,690	22,690

Vegetation Management Effects on Soils

Generally, detrimental soil impacts are expected to increase with increased vegetation treatment levels. Alternative 1 would accomplish 54% of the vegetation treatment needed to attain ARV, while Alternatives 2-5 would accomplish 89%. Therefore, detrimental soil impacts would be greater under Alternatives 2-5 than Alternative 1. However, effects to soils in forest, woodland or juniper settings may vary.

Most forest and woodland management activities affect the soil resource. The creation and use of skid trails and landings compacts soils and reduces infiltration rates. As a result, these areas are more prone to excess erosion. Tractor based machine piling can create excessive compaction. Forest monitoring results (Slaughter and Gasbarro 1988) have shown that the cumulative effect of multiple entries commonly results in excessive amounts of soil compaction on ground based tractor units. On steep units (greater than 35 percent slopes) ground based harvest can cause soil displacement. Displacement is an irreversible loss of top soil. Heavy equipment use can cause compaction, soil disturbance and puddling during woodland and forest thinning. Puddling can be caused by heavy equipment use and generally occurs on soils that have a clay content of more than 35 percent and high moisture content (35-52 percent moisture by weight depending on the texture). The cumulative effect of repeated entries can increase compaction and erosion more than an individual entry. Compaction may be partially alleviated through sub soiling (see glossary). Detrimental soil impacts result from compaction, displacement, puddling, hot burns with soil temperatures over 300 degrees C, erosion, altered soil nutrient levels, loss of organic debris (limbs, down logs, etc) and high intensity fire. The degree of detrimental soil impact is generally related to the amount of ground based mechanical harvest activity. Ground based harvest of woodland and forest materials, and thus detrimental soil impacts would be less under Alternative 1 than Alternatives 2-5.

Alternative 1 does not limit the area of detrimental soil impact during vegetation treatments; detrimental soil impacts have historically been prescribed at 15% or less of project areas. Under Alternatives 2-5, detrimental soil impacts are officially limited to 15% or less under Alternatives 2-5. Therefore, the practical detrimental soil impacts from vegetation treatment does not vary by alternative.

Multiple ground based timber harvest entries every 60 to 90 years occurring on the same piece of ground without documentation and monitoring have the potential for exceeding detrimental compaction limits in future rotations. These harvests and impacts would occur outside the timeframe of this plan but would accumulate. Dispersed use normally does not produce detrimental soil impacts. It is the frequent and repeated uses that over time, little by little, gradually reduce soil function and productivity.

The use of BMPs under all alternatives would equally minimize erosion. Units that have been logged previously typically utilize BMPs to keep detrimental soil impacts within guidelines. Those measures can include using designated skid trails placed 100 ft apart, directional falling, winching, mastication or chipping as an alternative to machine piling. Timber felling does not directly affect the soil resource; however, it does affect the way that machines can transport, or skid, logs to the sorting and loading areas (landings). If a BMP requires that trees are felled in a way which reduces the skidding travel area, then detrimental soil impacts would be reduced.

Many of the tree species that occur in forests and woodlands require some level of bare mineral soil for germination. Disturbance (site preparation) is typically required to expose mineral soil for forest plantings. The use of BMPs can reduce loss of long-term soil productivity as a result of site preparation activities.

A range of scenarios is possible for juniper thinning. Juniper thinning with mechanized ground based harvesting activity increases short term erosion rates, especially on sensitive soils. Under Alternatives 2-5, 273,577 acres would be available for forest or juniper woodland treatments. About 93,000 acres of those would be identified as priority treatment areas. Of the total priority treatment areas identified, 45 percent of these areas are located on sensitive soils with a high potential for erosion. Of the priority treatment areas located on sensitive soils, 91 percent of these acres are on slopes of less than 35 percent and would be open for ground based harvest treatments. The detrimental soil effects from juniper ground based treatment would be greater under Alternative 2-5 than Alternative 1.

However, complete site occupation by juniper and/or stand replacement wildfire would cause detrimental soil impact across a greater area than ground based harvest. Therefore, if the 273,577 possible juniper treatment acres is allowed to progress to type III juniper density (see glossary) and subject to stand replacement wildfire, then detrimental soil impacts would be greatest in Alternative 1. Assuming juniper thinning treatments would be done with a light touch, with limited heavy equipment and using BMPs, juniper management would cause less detrimental soil impact under Alternatives 2-5 than Alternative 1. The likelihood of these scenarios is dependent on budget, priorities and restrictions from other resources.

Livestock Grazing Effects on Soils

Livestock grazing can cause compaction and soil erosion. Hoof traffic compacts soil and the removal of ground cover vegetation can leave soil vulnerable to erosion. Concentrated livestock use, such as near salt blocks, shade and watering areas, can both compact soils and eliminate ground cover vegetation. However, erosion and compaction of soils are not absolute to all livestock grazing management. Grazing effects on soils vary according to AUMs (the number of animals grazed), intensity (number of animals per acre), duration (length of grazing period), and season.

With the exception of some proposed allotment closures, these grazing variables would not be specifically modified by any of the alternatives for the plan area. Under all alternatives, grazing would be guided by Standards for Rangeland Health and Guidelines for Livestock Grazing Management in Washington and Oregon (S&Gs). Individual grazing allotments would be evaluated using the five standards for rangeland health criteria from this guidance. If grazing is a cause of not meeting these standards, then livestock management, such as animal numbers, season of use, and grazing intensity would be adjusted. Attaining these standards would maintain or improve soil function under all alternatives.

In the plan area, livestock grazing is more frequent and concentrated near water, on flat slopes, and on areas with low amounts of surface rock fragments. Heavy livestock use and hay production considerably reduces the native grass populations along the river corridor and provides opportunity for cheat grass and medusa-head to expand their range. These annual grasses provide the fine fuels necessary for increased fire frequency. As an example, there were 10 fires from Service Creek to Priest Hole during 2007(most were lightning caused). Frequent fires maintain these rangelands in a continued early seral state. Over time, this reduces soil function. With the lower root mass of annual grasses contributing less organic matter to the soil, water infiltration, water holding capacity and nutrient cycling are also reduced.

No alternatives propose season long grazing year after year or 'over grazing.' Changing climate, forage availability, and other range conditions require frequent grazing management adjustments to ensure compliance with objectives for soils and other resources. Broad seasons of use and AUM levels provide flexibility for annual adjustments in the actual season and amount of grazing authorized. Grazing on the North Fork allotments, like all allotments, would be sustainable, protect soils, and meet Rangeland Health Assessment's Standards and Guides.

As this plan does not propose grazing management changes outside of the North Fork acquired lands, it is anticipated that grazing effects on soils will not differ between alternatives. However, if grazing allotments are relinquished, and ecological conditions are early seral with invasive annual grasses (i.e. cheat grass and medusa head), burn frequencies could increase. This would allow for the possible spread and expansion of these invasive grasses into existing native shrub and grass communities. The low root mass of the annual grasses in a terminal steady state would gradually reduce soil function over the life of the plan. Under this scenario, loss of soil function from least to greatest is: Alternative 1, 3, followed by Alternatives 2 and 5, and finally Alternative 4.

Relinquishing allotments with mid to late seral vegetative communities would have different impacts. The lack of livestock use would allow the native vegetative communities to move toward later seral ecological conditions. Later seral ecological communities normally have higher native grass to shrub and tree ratios, which increase the fine root mass from native grasses, and increase soil function. Also, the lack of livestock use would reduce trampling compaction on soil close to water sources. Under this scenario, loss of soil function from least to greatest is: Alternative 4, followed by Alternatives 2 and 5, 3, and finally Alternative 1.

Wildlife Effects on Soils

The effects of antelope, deer, elk and wild horse grazing on the soil resource are similar to the impacts of domestic livestock. Concentrated trampling and intensive use can result in compaction, reduced vegetative cover and ultimately erosion and loss of soil function. Presently, only scattered trampling and erosion problems occur.

There is a risk, however, that anticipated increases in the size of elk herds, regardless of alternative, could result in accelerated erosion on fragile, non-forested portions of the winter ranges managed to provide winter forage. These areas were severely eroded during the early years of sheep and cattle grazing. Since wildlife populations are influenced by habitat conditions both on and off BLM lands and the plan area, differences in soil impacts as a result of the alternatives are likely to be negligible.

Seasonal road closures to improve wildlife winter habitat conditions and to reduce the animal stress from people will reduce compaction from vehicle use of the transportation system. Closing roads in early spring when conditions are too wet for driving would reduce compaction of these roads. Higher road densities result in increased soil compaction and greater loss of soil productivity than lower road densities. The resulting soil compaction and loss of soil productivity are least in Alternatives 4 and 5 and greatest in Alternatives 1, 2 and 3.

Wild Horse Management Effects on Soils

Under Alternatives 2-5, wild horse management is specifically tied to meeting soil detrimental impact objectives. The detrimental soil impact objectives are not included in Alternative 1. Therefore, detrimental soil impacts from wild horse management would be less in Alternatives 2-5 than Alternative 1.

Fire Management Effects on Soils

Fire management activities affect the soil resource in three ways. The first, machines used for piling slash compact and displace soil; second removing woody debris reduces long-term productivity of the site; and third fire can directly alter the chemical and physical soil properties. Machine piling is the leading cause of soil compaction in forested areas, based on Malheur National Forest monitoring results.

Prescribed fire has short- and long-term effects on soils. Immediate effects result from the loss of protective organic matter (i.e. live and dead vegetation), disturbance of biological crusts, and changes in the physical and chemical characteristics of the soil surface. These effects vary according to the fire intensity and duration. High fire intensity or duration may cause some soils to become hydrophobic (water repellant), which impedes infiltration and increases surface runoff. However, some coarse textured sandy and pumice soils are naturally hydrophobic. Volatilization of nutrients may cause additional long-term loss of site productivity. Germination, vigor, and spread of some noxious weed species and introduced annuals are more pronounced following fire. Fire applied in inappropriate locations, such as warm and dry sites or sites with south aspects and high annual to perennial grass ratios, can allow undesirable plant species to increase and spread. Fire's effects on soils may be greater on sites with undesirable plant species (annual grasses) than on sites where healthy native vegetation is present.

One consequence of not applying mechanical or prescribed fire fuels treatments could be an increase in large, high-intensity wildfires. These hot burning fires (>300 degrees C) can dramatically reduce soil productivity through volatilization of nutrients and surface organic. The short and long term loss of watershed cover can also increase erosion rates (see Fire Management effects).

Juniper invasion is increasing throughout the plan area (see Appendix F). With this increase in juniper density, it is expected that Alternative 1 would have the greatest potential for stand replacement wildfires. The increased mechanical treatments proposed in Alternatives 2 through 5 would reduce the wildfire potential, but would have effects similar to those described in the vegetation management section on detrimental impacts to soils. The effects of these vegetation treatments would be most intense around communities within the first band of the wildland urban interface (see Fire and Fuels section, Chapter 2). Best management practices, adaptive management and monitoring are expected to reduce or minimize the detrimental effects on soil productivity from these actions.

Mining Effects on Soils

Mining exploration and development can dramatically reduce soil productivity and soil function, depending on the intensity and amount of activity. Of all the types of mineral extraction, surface mining causes the greatest loss of soil function and productivity. This type of mining generally involves removing the productive surface soil in order to get to ore-bearing substrata below. Underground mining impacts less surface area.

Resource and resource use protections applied to mineral use include mineral withdrawals, requirements for no surface occupancy, avoidance areas, stipulations and BMPs. Following the BMPs such as requirements for surface rehabilitation of a comparable area of disturbance, will keep the disturbance are small, which improve long term soil function. Stipulations requiring 2 years of follow-up monitoring of erosion control measures and re-vegetation success increase soil productivity. These increased protections from surface mining activities result in greater soil productivity and soil function under Alternatives 2-5 than in Alternative 1.

Effects of All Alternatives on Soils

Using adaptive management with a concerted effort for finding the most effective best management practices for minimizing detrimental soil impacts is essential to implementing a successful plan. Of the proposed alternatives, Alternatives 4 and 5 are the most favorable to soil function, followed by Alternative 2. Alternative 1, the no action alternative, is most impacting of all alternatives, followed by Alternative 3. Table 4-3 summarizes the effects of the alternatives on soil function for this plan.

Table 4-3. Comparison of soil effects of alternatives for selected resource uses for the John Day River Basin plan area.
5 = greatly maintains soil function, 1 = largest loss of soil function.

Resource Use	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Recreation Non-motorized	1	2	2	2	2
Recreation Motorized	1	3	2	5	4
Transportation	2	3	1	3	3
Timber/compaction	1	2	2	2	2
Grazing (areas in good range condition)	1	3	2	4	3
Grazing (areas with invasive plants)	4	2	3	1	2
0 mi/sq. mi road density	1	2	2	2	2
2 mi/sq. mi road density	1	3	2	4	5
No road density limit	1	3	2	4	5
Wild Horses Management	1	2	2	2	2
Wildfire risk	1	2	2	2	2
Mining	1	2	2	2	2
Total	16	29	24	33	34

Air Quality and Greenhouse Gas Emissions

Introduction

Analysis of the environmental consequences of the alternatives on air quality considered the following key resources or resource uses: wildland fire, prescribed fire, noxious weed control, vegetation treatments, grazing, mineral and energy development, transportation and recreation management of motorized uses.

Indicators used to compare environmental consequences between alternatives include: acres burned, miles of road, and acres of land available for mineral development.

Air Quality Indicators

- **Greenhouse gas emissions.** Gaseous emissions of various types are explained in more detail under Chapter 3, Climate Change. The sources of emissions from BLM land management are described in this Air Quality section of Chapter 4.
- 1 **Acres burned.** Acres burned is an indicator of the amount of smoke, particulate matter and green house gases released. Forested ecosystems that contain more overall biomass are assumed to yield more smoke than the more lightly vegetated rangelands and shrub-steppe ecosystems. The plan is strategic rather than specific, and therefore the total annual emissions from burning of piles, under burning, and broadcast application of fire is not directly measurable, but is indicated by acres of treatment proposed.
- **Miles of road and motorized trails.** The amount of fugitive dust from roads would be proportional to the miles of the roads. Most BLM roads are native or gravel surface, which can produce dust.
- **Area Open or Limited for OHV use.** The amount of dust and gaseous emissions from OHV use is assumed to be proportional to the acreage of land allocated for OHV use.
- **Acres of land available for mineral development.** The amount of fugitive dust for mining operations would be proportional to the availability of land for mineral development.

Air Quality Assumptions

- 1 Sources of air pollutants for all alternatives in this plan are limited to smoke from wildland fire and prescribed burning, herbicide applications, and dust from use of un-surfaced roads as well as road construction activities.
- 1 Wildfires in rangeland are assumed to continue at their current frequency, intensity and duration on average. Wildfires in forestlands are predicted to increase in frequency, intensity, and duration as the climate continues to change. However we do not know when these changes will occur or how they will play out over the plan area.
- 1 While other sources of emissions are locally important (road construction, maintenance and use, mining, travel, farming, etc.), prescribed burning could degrade regional or airshed air quality.
- 1 Smoke emissions from prescribed burning will generally dissipate to the south of the plan area, in the direction of the most common winds. Prevailing winds are NNW in the summer months and are southerly for the rest of the year.
- Smoke management strategies will be coordinated with state and local authorities as fire is used more frequently to preserve, restore or maintain forest and rangeland health and reduce hazardous fuels, primarily in the urban interface. All smoke emissions are coordinated through the Oregon Department of Forestry under the Oregon Smoke Management Plan (SMP). The SMP now covers the entire state for forested lands. Prescribed fire on forested BLM lands in the plan area will follow the SMP. Rangeland burning is not covered by the SMP.
- 1 Smoke from prescribed burning competes with smoke from agricultural burning, residential wood consumption, and smoke from neighboring agencies relative to smoke limits. Wildland fires from within the plan area and also upwind sources on other ownerships will continue to contribute sporadic smoke impacts in the summer months. Many of the smoke impacts to the area come from field burning to the north and west and from wildland and prescribed fires on the Malheur, Ochoco and Umatilla National Forests.
- 1 None of the alternatives propose changes of a magnitude that would violate the Clean Air Act.

Analysis of the Effects of the Alternatives on Air Quality

Effects Common to All Alternatives

Proposed management of the following resources or resource uses would not have impacts to air quality: Aquatic Resources, Wild Horses, Wilderness Characteristics, Cave Resources, Visual Resources, Special Designations, Native American Uses, Paleontological Resources, Cultural Resources, Livestock Grazing, and Lands and Realty. 1

All of the alternatives would treat the hazardous fuels in the Wildland Urban Interface (WUI) 1 as identified in Community Wildfire Protection Plans (CWPPs). This will have the effect of producing particulate matter, but since all burning activities would comply with the Oregon State Smoke Management Plan and the Clean Air Act, no air quality effects would be expected to exceed the National Ambient Air Quality Standards (NAAQS). 1

Burning would occur in the uplands away from the populated areas for vegetation management objectives (see vegetation section, Chapter 2). While the preferred disposal of hazardous fuels is use as commercial product or biomass energy sources, burning would be done where those options are not feasible due to access or economic factors. Areas in conifer forest environments are more likely to contain piles for burning than rangeland ecosystems. Piles would be burned in the spring or fall after some precipitation has been received to limit the potential for fire spread, but while the larger material in the piles is still dry enough to burn. Dry fuels burn cleaner and hotter than wet fuels; therefore, less smoke is produced. All burning would be done under desirable weather conditions to meet objectives for risk reduction and fuel consumption, and to minimize smoke impacts to the populated areas and protect visibility in Class 1 areas (the Strawberry Wilderness is the nearest Class 1 airshed). Despite mitigation measures to reduce impacts, smoke would still be visible, and could cause a temporary localized exceedence of particulate matter standards or result in impaired visibility.

Vegetation Management Effects on Air Quality

Mechanized activities associated with vegetation treatments would create dust and gaseous emissions from road construction, use of heavy equipment, and timber hauling. Dust would settle within a short time period and stay close to the point of origin. Since the average annual amount of mechanical vegetation treatments increases from 700 acres under Alternative 1 to 1,500 acres under Alternatives 2-5, Alternative 1 would have less gas and dust emissions than Alternatives 2-5.

Herbicide use for noxious weed control will be similar between alternatives. Herbicide use is highly localized and constrained by BMPs to control drift, so there will be no substantial difference in herbicide drift between alternatives.

Fire and Fuels Management Effects on Air Quality

Smoke emissions (including greenhouse gasses, see Chapter 3) from wildland fires are a short-term event, mainly restricted to the active burning phase of the event. Rangeland fires are typically hot, rapid events in which most of the fuel consumption and smoke production occurs with the passage of the flaming front, and very little smoldering occurs after the fire due to the lack of duff and large fuels. Woodland, shrubland, and grassland fuels have a relatively short residual burning period. The length of time that smoldering combustion continues is measured in hours, rather than days or weeks as in forested vegetation types.

Under Alternative 1, 2,900 acres per year are proposed for prescribed burning (Table 4-4). Alternatives 2-5 also propose to burn approximately 2,900 acres a year with an additional 1,500 acres of Appropriate Management Response (AMR, see glossary). The number of acres burned per year under AMR (Alternatives 2-5) could be larger or smaller than suppression (Alternative 1). The actual magnitude of change will not be known until the direction is implemented and has time to “mature.”

Wildland fire use (WFU; see glossary) is the use of naturally ignited wildland fire (managed under AMR). Wildland fire use could increase smoke emissions above those generated by suppression efforts. In the long term, however, additional acres burned through WFU could also result in less stand replacement wildfire. Reductions in stand replacement wildfire would result in a net decrease in emissions under Alternatives 2-5, compared to Alternative 1.

Under Alternatives 2-5, WFU could emit smoke longer than planned ignitions, depending on the vegetation types involved. Alternatives 2-5 have the potential to violate NAAQS. These violations are more likely to occur in severe burning conditions with multiple large fires burning across multiple jurisdictions. Longer duration fires would result in longer periods of time when smoke may limit visibility and elevate levels of particulate matter. Severe wildland fires would result in greater direct, short term emissions due to large volumes of smoke. Indirect impacts from severe fires could stem from reduced or eliminated vegetation cover, exposing the underlying soil to wind and water erosion, which would in turn increase levels of dust during wind events. Although treatment efforts to reduce fuel loads would result in some direct but minor impacts to air quality, decreasing the potential of catastrophic wildfire would reduce particulate matter emissions over the long term. As stated above, use of AMR on approximately 1,500 acres per year under the action alternatives will likely result in greater to air quality over the long-term than Alternative 1.

Smoke emissions from specific WFU and prescribed burn projects are managed under project specific smoke management plans. Moderate amounts of smoke could be experienced in the immediate vicinity of treatment areas. However, the smoke would be a short term emission, as most of these activities will take place to the east of populated areas and will be executed under conditions that will carry smoke eastward. Smoke mitigations from smoke management plans are similar across all alternatives.

The geographic area of analysis for cumulative impacts to wildland fire is the plan area and adjacent lands. Wildland fires in the region would continue to periodically contribute particulate matter to the airshed. Drought would increase fuel loadsin the short term, fire intensities, and the size of wildland fires. The Ochoco, Malheur, and Umatilla National Forests are increasing the annual acres burned in response to the National Fire Plan. Fuel treatments, wildland fire use fires, and Appropriate Management Response fires anticipated over the life of the plan, in conjunction with concurrent anticipated community hazardous fuels reduction projects and BLM actions are expected to increase total emissions in the short term with an expected long term reduction in the

total volume of wildland fire emissions as fuel breaks become more common and the probability of smaller fires increases. BLM action, in combination with other regional actions, would not cumulatively exceed the thresholds of the Clean Air Act standards because actions will be carried out in compliance with the State Smoke Management Plan.

Minerals Management Effects on Air Quality

Areas available for mineral leasing, sale or location would have effects on air quality. Sources such as construction, mining, and processing operations emit dust. Fuel consumption contribute gaseous emissions. Emissions of dust and gases would be greater under Alternative 1, where 74% of BLM lands are available for minerals, than under Alternatives 2-5, where 67% is available.

Recreation Management Effects on Air Quality

OHV travel by residents and recreationalists on BLM dirt and gravel surfaced roads, trails and open areas causes dust emissions. Use of these areas by motorized vehicles also results in gaseous emissions from fuel combustion. Within areas with a Limited designation, OHV use occurs on designated trails. In Open OHV designation areas, repeated use or use on sparsely vegetated rangelands may also produce dust, such as in the Little Canyon Mountain area. Alternative 1 has 5% more area of Open or Limited OHV designation than Alternatives 2-5. Therefore, Alternatives 2-5 would have less emissions of dust and gas from OHV use than Alternative 1.

Transportation Management Effects on Air Quality

Use of the interim and final transportation network by motorized vehicles would result in continued greenhouse gas emissions from fuel combustion, as well as dust emissions. During the summer months, dust is produced from both public and administrative use of unpaved roads. Alternative 1 has 742 miles of interim routes, Alternative 2, 4, and 5 have 333 miles of interim routes and Alternative 3 has 879 miles of interim routes, including 137 miles previously closed routes in the North Fork. Therefore, emissions of dust and gas from the transportation network are assumed to be greatest under Alternative 3, less under Alternative 1, and least under Alternatives 2, 4, and 5.

Livestock Grazing Management Effects on Air Quality

Cattle and other ungulates produce greenhouse gas emissions (methane) under all alternatives. Although the amount of grazing on BLM land varies by alternative, BLM allocation of AUMs is not the determining factor for livestock grazing levels across the entire plan area. Other factors such as weather, transportation costs, and distribution play a major role in cattle production levels. It is likely that gaseous emission from grazing would simply shift across the landscape, but remain at levels constant under all alternatives.

Vegetation

Introduction

Analysis of the environmental consequences of the alternatives on terrestrial and riparian vegetation considered the following key resources or resource uses: Vegetation, Aquatic Habitat, Fire and Fuels, Livestock Grazing, Visual Resources, Areas Managed for Wilderness Characteristics, OHV Use, and Lands and Realty.

Effects to vegetation depend on the amount, type, location, and method of treatments allowed and resultant vegetation community characteristics. When effects analysis requires more than a general discussion of vegetation management, Biophysical Settings (BpSs) were lumped into the following similar functioning groups: Grassland, Shrubland, Forestland, Juniper Woodland, Riparian, and Potential Restoration Needs. Individual BpS analysis, and a key to their general functional groups are contained in Appendix F.

Vegetation Indicators

Indicators used to compare environmental consequences on vegetation conditions between alternatives include:

- **Percent of treatment need met based on ARV.** Treatment need met is used as an indicator of the level of attainment of ARV objectives. Managing vegetation within site capability reduces the amount of uncharacteristic disturbance, provides spatial distribution to allow genetic exchange, and ensures that vegetative species compositions and structures exist in sufficient quantities to provide resiliency when disturbance does occur.
  For analysis purposes, the current treatment need identified to reach ARV is assumed to provide a relative amount and type of treatment needed over the longer term. These are not prescribed treatment numbers, but are being used to display likely treatment types and amounts for the purpose of effects analysis. Yearly budgets and personnel availability, weather, and refinements in site specific data may result in a variation in acres implemented yearly or in total, but the types and relative amount of treatment should be consistent. Due to this variability, the following analyses represent outcomes of treatment averages by alternative (Table 4-4).
- **Location and type of treatment – prioritization criteria.** Targeted vegetation treatments across the landscape are more likely to alter seral structural conditions in areas and methods necessary to better achieve ARV objectives across the landscape. Targeting treatments will also increase the likelihood that vegetative conditions will respond to natural disturbances in sizes and intensities that will retain or enhance seral structural compositions and facilitate moving those conditions furthest out of balance into ARV.
- 1 **Fire Regime Condition Class (FRCC).** FRCC is a measure of vegetation condition as it relates to natural disturbance or fire regime. FRCC provides a sense across the landscape of how departed vegetation conditions are from historic conditions relative to the expected type, intensity, and spatial distribution of fire and other disturbances.
- **Old growth.** Future treatments are more likely to retain old growth trees when clear definitions and management direction are provided. Identification of appropriate locations (Biophysical Settings) where old growth juniper would naturally occur increases the potential for long term sustainability of these conditions. Due to the time necessary to generate old growth characteristics and stands, the protection and management emphasis on these characteristics is necessary to ensure that ARV objectives for large structure and late seral conditions are attained.
- **Acres available for forest product production.** The potential to utilize forest material as a source of funding to offset treatment costs will allow greater amounts of treatment to be completed. Utilizing forest material will also reduce fuel loadings and increase the potential that Wild Fire Use could be implemented and meet vegetative objectives.
- **Area and type of riparian management objectives.** Restrictions applied within riparian areas influence the ability to treat vegetation. Without treatment overstocking and shade tolerant species can dominate sites and reduce the amount of early to mid seral conditions that occurred under Pre-European disturbance levels.
- **Area available for Appropriate Management Response or full suppression.** Suppression of fires over the last 100+ years has resulted in species composition and fuel load changes. The ability to manage wildfires under specific conditions allows for greater amounts of area where adjustments to species composition and fuel loadings can be treated.
- 1 **Acres of VRM Class I or II and Area of Critical Environmental Concern/Research Natural Area (ACEC/RNA).** Lands with these designations reduce the amount or tools available to treat vegetation compared to VRM Class III and IV. Limiting the tools or amount of area that can be treated will result in greater amounts of early or late seral conditions. There is also a greater risk of overstocked stands and stand replacing disturbances.

Vegetation Assumptions

- For the purposes of commercial activities, administrative access would be allowed on closed roads to meet vegetation objects; however, fewer open roads available to the public would limit the ability to access forest products.

- 1 Grazing adjustments to season and stocking will continue to be analyzed through the permit process and monitored through processes such as S&Gs, to insure that grazing management is consistent with site capabilities.
- 1 Grazing reduces fine fuels and thus, under certain grazing seasons, reduces fire risk.
- 1 All alternatives would follow State and Federal guidelines for WUI designation; however, existing WUI mapping areas would be updated with new designations, as appropriate.
- 1 The primary emphasis of vegetative treatments within Full Suppression Areas (Alternatives 2-5) and WUI Areas (Alternative 1) would be for fuels objectives associated with protection of resources and fire fighter safety, and thus more intensive than treatments outside of these areas.
- 1 The ability to use the full range of AMR would move more vegetation stands towards FRCC1.
- 1 Past management has contributed to current vegetation treatment need.
- 1 For the purposes of this analysis, it is being assumed that mechanical or prescribed fire treatments would not be done in seral conditions that are deficit across the plan area, except possibly in the case of "maintenance" treatments (e.g., the area has about 6,300 acres less of open, mature mesic ponderosa pine forest than is representative of ARV. Existing stands of open, mature mesic ponderosa pine would only be treated if "maintenance" (under burn) were needed. Also, no treatment was assumed necessary where early seral conditions (seral class A) are currently in surplus, except possibly in the case of seeding.

Analysis of the Effects of the Alternatives on Vegetation

Vegetation was analyzed to assess the effects of attaining alternative objectives.

Effects on Vegetation Common to All Alternatives

Proposed management of the following resources/programs have no new actions proposed or would have no anticipated impacts at this scale on vegetation communities, their management, or commodity production: Recreation, Special Status Plants, Cultural/Paleontology, Lands and Realty, Minerals, Soils, and Air Quality.

Within grasslands, the plan area currently has high amounts of uncharacteristic vegetation conditions due to the abundance of annual grass, noxious weeds, and farmlands. Under all alternatives, treatments in grasslands would continue to include spraying herbicides to control weeds, burning, and seeding.

Currently Aldrich Mountain and Strawberry Mountain WSAs contain forest vegetation with tree densities and/or slash loads above preferred levels. Under Alternative 1, portions or most of these stands would be lost to insects, diseases or wildfires unless prescribed burning is used to control densities and slash loads.

Vegetation Management Effect on Vegetation

Indicator: Treatment Need Met (current) and Location and Types of Treatments

Vegetation treatment currently needed to reach the mid point of ARV: 146,746 acres of rangeland, 50,977 acres of forestland, and 10,111 acres of riparian. When vegetative communities lack the appropriate mix of seral structural stages they are at greater risk of insect, disease, and stand replacing fire.

Table 4-4. Annual and 30-year Vegetation Treatment Assumptions by Alternative

Treatment Type	Alternative 1		Alternatives 2-5	
	Range* annual acres treated (30-year total **)	Forest annual acres treated (30-year total)	Range annual acres treated (30-year total)	Forest annual acres treated (30-year total)
Rx fire	2,000 (60,000)	300 (9,000)	2,000 (60,000)	300 (9,000)
Mechanical	500 (15,000)	200 (6,000)	500 (15,000)	1,000 (30,000)
Maintenance***	500 (15,000)	100 (3,000)	500 (15,000)	100 (3,000)
Appropriate Mgt Response****			1,500 (45,000)	
Yearly Totals	3,000	600	4,500	1,400
30 Year Totals	90,000	18,000	135,000	42,000
Current Need	146,746	50,977	146,746	50,977
% of Current Need Met in 30 Years	61%	35%	92%	82%

*Rangeland = grass, shrub, and juniper woodlands (See Appendix E – BpS descriptions and Appendix F – BLM BpS analysis and grouping).

**Numbers in parenthesis are yearly averages projected for 30 years.

***Maintenance will be prescribed fire entries following the first prescribed fire entry.

**** This is an estimate that may range considerably from year to year. The frequency and occurrence of lightning in a given year cannot be predicted.

Generally, under Alternative 1 specific seral structural objectives are not identified, although there is reference to managing toward mid to late seral conditions for all communities. Despite this direction the primary emphasis of rangeland treatments has, in practice, resulted in early to mid seral conditions. Also under Alternative 1, treatment emphasis would continue to be on rangeland vegetation settings where juniper is invading. The majority of practicable large landscape burns have been completed. Fire treatments would continue to be focused on large blocks of BLM lands or areas where projects can be done in cooperation with adjacent land owners.

All of the action alternatives provide direction for retaining the appropriate mix of seral/structural stages based on the BpS (See Appendix E and F). Many of the same types of treatments would occur under the action alternatives as under Alternative 1; however, based on vegetation management objectives it would be clearer which stand conditions need to be targeted for treatment to bring whole systems into the ARV. Needs for achieving ARV are also considered within the context of lands adjacent to BLM lands. This will allow the BLM under Alternatives 2-5 to consider the spatial context of the vegetative communities within a larger ecosystem, and consider actions within the light of how ecosystems function across ownerships. In some cases this may mean managing specific seral communities on BLM lands at the high or low end of ARV to accommodate shortages or surpluses in surrounding areas. Managing to within ARV using a more systematic approach under Alternatives 2-5 will result in treatments that are much more focused than Alternative 1 on meeting vegetation objectives. This approach would result in vegetative conditions where the types, intensities and response of vegetation after natural disturbance are within acceptable limits.

All of the action alternatives also establish prioritization criteria and a map depicting areas where coordinated interdisciplinary treatments will address the greatest number of resource needs (Map 4). ARV analysis points out the possible need to delay burning in some areas until shrub establishment has occurred in past treatments, to increase juniper cutting in some areas, and to increase pre-commercial and commercial thinning of forested stands.

Rangelands

Within rangelands, the majority of shrub and juniper BpSs currently have too much early (grass dominated) and late (juniper dominated) seral stages relative to ARV. There is also a deficit in mid seral communities (e.g., shrub dominated sites with good graminoid understories that are not being invaded by juniper). A fully developed western juniper woodland (Phase III) can reduce the understory to the point that herbaceous plants cover

less than one percent of the soil surface, and annual grass sites alter the fire regime and compete with native vegetation for moisture.

Under current direction, continued under Alternative 1, efforts to do landscape scale burns have reduced juniper and shrub cover. Most of the sites burned to date have contained mountain or Wyoming sagebrush. On similar sites Ziegenhagen (2003) found that percent live canopy cover increased 3.429 times (3.932 to 2.990, 90% CI, p-value ≤ 0.001) with a doubling of years since fire. Similarly, mean sagebrush densities increased 0.227 shrubs / m2 (0.267 to 0.188, 90% CI, p-value ≤ 0.001) with each doubling of years since fire. Much of the current early seral communities can be expected to naturally transition into mid seral stages, and reduce shortage in this community type over time.

Natural successional processes would in the absence of fire continue to increase the number of post settlement western juniper in sagebrush habitats, creating a general homogenization of the landscape. Increased tree cover and density of post settlement trees would occur at the expense of the associated understory vegetation. With increases in juniper cover the amount of mineral soil exposed increases, especially on south slopes.

Removal of western juniper increases resources (soil moisture and soil nutrients) available for the remaining vegetation. As cover and density of native herbaceous plants increase so does the sites ability to capture and utilize precipitation and solar energy. The increased spatial distribution of native herbaceaous vegetation also increases the potential of fire spread during less extreme fire conditions. More natural fire spread and intensities will extend the time these stands remain in early and mid seral conditions where herbaceous species dominate opposed to woody species.

Rangeland burns seldom remove more than 50% of the juniper cover. The lack of natural fire under current management direction (Alternative 1) has allowed juniper encroachment on so many acres that prescribed fire treatments across these areas could result in the amount of early seral (lacking shrub cover) being more than that expected under normal burn frequencies. In the past, projects were identified using a variety of methods, often specific to one resource benefit. If current management were to continue under Alternative 1, it is likely that the surplus of early seral rangeland communities would continue to increase and the surplus of late seral communities would decline.

Under the action alternatives, treatment types in rangelands would be similar to Alternative 1 with the exception of the spatial orientation and timing of activities. Activities would be more focused on bringing conditions into ARV and trending towards FRCC1. Over time this will bring natural disturbance patterns, function, and effects to seral structural conditions more in line with historic fire regimes. Vegetative conditions within ARV and predominantly FRCC1 are a more diverse resilient complement of vegetative conditions across the landscape.

In general, Alternatives 2-5 targets areas and treatments that would facilitate AMR which in turn would result in a greater number of woody species dominated acres being treated than Alternative 1. As a result, Alternatives 2-5, in conjunction with the use of BMPs (see Appendix B) would result in less loss of understory vegetation, retention of shrubs in areas currently outside of ARV, and greater treatment through natural processes (AMR).

Forestlands

Within forestlands, current seral conditions show a surplus in the smaller size classes, multi storied canopies, and later seral species (Appendix F). The lack of pre-commercial and commercial thinning if continued under Alternative 1 would result in denser stands with more shade resistant species compared to Alternatives 2-5. This would subject the remaining large trees to competition stress, risk of insect, disease, and stand replacing fire, all of which would increase the deficit of large structure and surplus of small structure.

In comparison, under Alternatives 2-5 a greater emphasis would be placed on treatment in priority areas and active forest management of stocking densities. Through time the increased focus of treatment would reduce the risk of stand replacement in dry mixed conifer, pine, and aspen stands, reduce the potential loss of large structure components, and create conditions where fire will reduce ground fuels, prune, and thin stands consistent with the fire regime.

Although similar in the assumed amounts of treatment, targeted treatments to meet ARV objectives and use of AMR in the action alternatives address far more of the current need than Alternative 1. As shown in Table 4-4, the action alternatives address 31% and 47% more of the current treatment need in rangelands and forestlands respectively over 30 years. Treatment need displayed in Table 4-4 reflect the need to reach ARV mid point. Actual departure from ARV is displayed in Appendix F. When the continued growth and expanding range of tree species is considered, Alternative 1 has a greater risk of vegetative conditions not being within the ARV.

Old Growth Management

Without specific definitions or management direction to retain or promote juniper woodland and old growth forest, these values will not receive adequate protection. Under Alternative 1, currently only the Baker RMP mentions old growth (see glossary), and very few of the forested acres are within the Baker RMP boundaries, there would be only general direction to retain old growth. There would be no old growth definitions or old growth management requirements. The other plans currently covering the JDB plan area are even more silent on the issue of old growth management.

Juniper

Prior to Euro-American settlement, fire limited the range of juniper. Where post settlement western juniper trees continue to establish and grow in old growth stands, cover and density of western juniper increases. Mortality rates increase due to competition for water and nutrients. The amount of standing and dead woody material also increases. Post settlement understory trees increase ladder fuels and increase the potential for wildfire and thus loss of existing old growth trees.

Rangeland maps currently identify 8,149 acres where old growth juniper trees and stands could be managed. Although not specified in the existing RMPs, the BLM has recognized the need for old growth management for individual trees for several years now. Individual and patches of old growth trees have been left within juniper cuts. Due to the often rocky, harsh nature of old growth juniper sites, loss to prescribed fire is limited. These management actions and trends would be expected to continue under Alternative 1. Under the action alternatives, all rangeland BpSs with a juniper component would require a percentage of those sites to be managed toward or retained in old growth juniper conditions. Additionally, definitions for old growth trees provided under Alternatives 2-5 would increase the likelihood that those trees are retained during treatments.

Forested

Throughout the past and current planning period (1985 – present), large and small diameter trees were both harvested and retained for future forestland habitat. However, due to the current lack of direction, the majority of the forested BLM lands currently have scattered large trees that would meet old growth definitions, but patch sizes are insufficient to meet the definition of an old growth stand. There are currently 252 acres that would meet the old growth stand definition (see glossary). Historic logging practices on surrounding lands seldom retained old growth values. Over the past two decades retaining large structured forest has become more common, especially on federal lands. These trends would be expected to continue under Alternative 1. The action alternatives provide a definition of old growth trees and stands, seral structural objectives by BpS, and guidance for retention of large trees.

See Appendices E and F for existing and desired acres of large structure forest (forested seral classes D, E, and sometimes C). The action alternatives provide guidance for the desired amounts, types and structural components (e.g., patch size, snags, down logs, etc.) as appropriate for the site. The action alternatives also provide direction for managing insect, disease, and fire to limit the risk of loss of old growth to disturbance.

As described above, the greater emphasis placed on treatment of forested stands in the action alternatives will reduce the potential for insect and disease mortality, competition stress, and stand replacement fire compared to Alternative 1. This combined with clearer old growth retention standards and definitions would result in more forested stands moving toward old growth conditions.

Forest Products and Areas Designated for Primary Forest Management

Under Alternative 1, there are 135,719 acres (35,390 acres forested) currently in Timber Management Units (TMUs) with a management emphasis on forest health and production, as well as the enhancement of other resources. Juniper products are available on 207,503 acres. There are 44,298 acres of forested habitat that are not in a TMU and would likely not have received treatment for forest health under Alternative 1. The current production rate or ASQ for the plan area is an average of 3.58 million board feet (mmbf) per year. However, since 1997 the plan area has fallen short of this rate by 73%, averaging 0.956 mmbf per year (See John Day Basin Analysis of the Management Situation (AMS), page 139). Forest management would primarily be salvage of dead trees and stands with some treatment in WUI. The lack of proactive treatment across all forested stands would result in overstocked stands, a shift in species composition to more shade tolerant species, greater risk of drought and fire loss, and an increased time frame to attain old growth conditions or risk of loss of those components.

Following current direction, few commercial or non commercial permits would be provided under Alternative 1 on an annual basis. When vegetative treatments are applied, efforts would be made to utilize as many products as possible. Road access for non commercial products would continue in the current state.

Under the action alternatives there are no areas designated with a timber management emphasis. Under these action alternatives, 242,893 acres (207,503 juniper and 35,390 forest) would be available for forest or juniper products based on an emphasis on forest health with forest products as a by product. Probable Sale Quantity (PSQ) would be 2.54 mmbf per year, and would be available for every 1,000 acres treated. Forest and juniper products would be made available when treatments are applied. The action alternatives remove 11,929 acres (with the exception of the Big Canyon area) from forest and juniper product availability by designating these areas to be managed for Wilderness Characteristics. This designation would generate 1.04 mmbf per year less than if Alternative 1 was fully implemented. In addition, restrictions and guidance in the action alternatives will result in fewer large trees being included in the volume. Thus, of the 2.54 mmbf generated in the action alternatives, the material provided would generally be smaller than in Alternative 1. The lack of a large tree component in sale offerings could make the sales less attractive to bidders. If removal of small diameter material is not economical, fuel loads could increase in treatment areas until prescribed fire can be applied.

The action alternatives would allow commercial forest health treatments on more acres than Alternative 1 thus resulting in a potential for greater amounts of treatment to be completed. The primary emphasis toward timber production within the identified TMU in Alternative 1 would result in an increase of small to small saw log size classes with open conditions. Forested lands in the planning area currently have a surplus of these conditions. The increased emphasis on forest treatments for forest health in the action alternatives would reduce surpluses of smaller material and adjust species compositions (generally toward shade intolerant species).

Based on management direction contained in the action alternatives the amount, type, and locations of treatments would accomplish 30 to 50% more of the ARV and FRCC1 objectives than Alternative 1 would. The action alternatives are also more likely to retain or enhance development of unique or limited vegetative conditions such as aspen and old growth.

Aquatic Habitat Management Effects on Vegetation

Under Alternative 1, 51,260 acres would be managed based on guidelines contained in PACFISH for Riparian Habitat Conservation Area (RHCA) management. Current PACFISH buffers are 300 feet on each side of fish bearing streams and 100 feet on each side of non fish bearing streams. These buffer widths and the requirement to do watershed analysis have limited, or in most cases precluded, necessary treatments within riparian areas. Currently most forested and juniper stands within riparian areas have higher than prescribed basal areas (see glossary). Hence, under Alternative 1 forest stand vigor is restricted and forest conditions are more susceptible to insect and disease epidemics, competition stress, stand replacing fires, and a shortage of desired riparian hardwood species.

Under the action alternatives, 139,673 acres would be managed based on guidelines contained in the Aquatic Conservation Strategy (ACS; see Chapter 2). The action alternatives provide Best Management Practices (BMPs) for protection on 88,413 more acres more than Alternative 1. Objectives, actions, guidelines and BMPs contained

in the action alternatives, such as ARV, address most of the issues contained in watershed assessments from a vegetative standpoint.

PACFISH requires formal watershed analysis to be completed prior to riparian management, and existing management focuses on avoiding impacts from vegetation treatments. Hence, riparian habitats seldom receive vegetation treatments under PACFISH management direction. The ACS allows for vegetation treatments with interdisciplinary team (IDT) input and prescribes active vegetation management in riparian areas.

All of the action alternatives increase the potential to treat conifers within riparian and terrestrial areas contained within riparian and lentic buffers. Under the action alternatives, treatment in these areas would reduce the risk of disturbance events impacting adjacent terrestrial vegetation, allow for management of riparian and lentic hardwood species, and reduce the risk of losing large conifer trees.

Currently, juniper densities are increasing within riparian areas and are out-competing riparian associated species. Many riparian habitats no longer exhibit riparian characteristics due to water loss and shading. Under Alternative 1 and without treatment, this trend would be expected to continue. Under the action alternatives, treatments would likely target juniper and conifer encroachment on flood plain terraces and lentic areas. These types of treatments would benefit species such as greasewood, basin wild-rye, basin big sagebrush, elderberry, and mock orange.

Shade tolerant forestland species have drastically increased over the last two decades resulting in overstocked stands, increased fire and drought stress to large trees, and shaded-out riparian species. Under Alternative 1 and without treatment, the loss of riparian species and large structure trees is likely to continue. Under Alternatives 2-5, treatments would likely target shade tolerant conifer trees in the mid and understory. Treatments in lentic areas may remove all but the large structure conifer. These types of treatments would benefit species such as aspen and cottonwood, two of the species most departed from ARV from the standpoint of their relative abundance. The action alternatives would attain ARV and FRCC objectives better than Alternative 1.

Fire and Fuels Management Effects on Vegetation

Under Alternative 1, there are 22,304 acres designated as WUI. More intense treatments in the WUI area, with the sole objective of reducing fire hazard, would be considered under Alternative 1 than Alternatives 2-5. The approach under Alternative 1 would meet WUI objectives, but could lead to vegetation conditions that are out of balance across ecosystems. The lack of designated areas for AMR (including WFU) limits that ability to utilize natural fire starts to move stands toward more ecologically intact conditions (FRCC1).

The action alternatives designate 85,391 acres of WUI, 22,304 acres of Full Suppression, and 434,306 acres of AMR. With potentially greater funding availability for WUI treatments than in the past, a greater percent of vegetative stands and communities could be treated for both community safety and meeting ARV objectives. Treatments in the Full Suppression areas would still be for the primary purpose of reducing fire risk; however, because the action alternatives require vegetation conditions to be within ARV across BpSs, watersheds, and the plan area as a whole, treatment needs within and outside of Full Suppression areas would be considered in concert to assure balances fire risk needs with ARV and FRCC objectives. Utilization of AMR to move BpSs toward FRCC1 would also reduce the need to implement other treatments to meet ARV objectives.

Following BMPs and resource objectives AMR and WFU would be expected to be allowed in grasslands with good native species composition and limited annual grass, shrub and juniper communities where post settlement juniper would be removed, and/or forested understory burns. These types of treatments would result in less shade tolerant forest species, fuel loading, and late seral species (juniper and shrubs) in rangeland BpSs. These conditions are currently surplus and without treatment are expected to increase throughout the planning area.

The focus approach, increased WUI designation and expected funding association, and the ability to utilize AMR and WFU in the action alternatives would increase the amount of treatment and ability to meet ARV and FRCC objectives over Alternative 1.

Grazing Management Effects on Vegetation

It is assumed that ungrazed lands will accumulate more abundant and contiguous fine fuels thus allowing fires to spread and carry through areas where they wouldn't if the fine fuels were grazed off yearly. Grazing on allotments is considered sufficient to limit the accumulation of fine fuels. It is assumed that reserved forage or closed allotments would either be grazed so infrequently or not at all that fine fuels would be allowed to accumulate. For purposes of analysis it is assumed that all grazing allotment permits would be voluntarily relinquished (see Livestock Grazing, Chapter 2). In practice, since permit relinquishment is voluntary, changes in the categorization of open, closed and reserve forage allotments could vary greatly across the plan area (Tables 4-5 and 2-25).

Table 4-5. Acres of Open, Closed and Reserve Forage Allotments in the plan area if all grazing permits were relinquished.

	Alternative 1 acres	Alternatives 2 & 5 acres	Alternative 3 acres	Alternative 4 acres
Open and Reserved Forage/Open	395,495	181,217	182,831	84,818
Reserved Forage, Reserved Forage/Close, Close, and Close Now	46,435	260,712	259,098	357,111

Under Alternative 1, the majority of allotments are currently in a rest rotation system, so even though they have an active permit, portions of the allotment are ungrazed at times. Herbaceous vegetation accumulations would be on a much smaller scale than what would occur if the entire allotment was not grazed. The majority of allotments are grazed in the dormant season which means that during fire season they typically have current year's growth which retains moisture later into the year than fine fuel buildup that is dead from previous years. Under intense fire burning conditions even recently grazed stands will burn; however it is assumed that actively grazed allotments will have less fire spread during lower intensity burning conditions due to fuel continuity. In areas of high annual grass concentrations less fire spread would limit the potential spread and dominance of the annual grasses. In mid/late seral grass and shrub communities it limits the control of woody species. In forested communities it can reduce connectivity with ladder fuels reducing the potential for crown fire in stands with shade tolerant species in the understory.

The removal of grazing on closed allotments in Alternatives 2, 3, 5, and even more acres in Alternative 4 would have larger blocks of ungrazed vegetative communities where fine fuels would build up. This would increase fuel continuity and increase potential fire spread. Increased spread potential would allow for more acres to be treated through AMR for resource benefit under the action alternatives than Alternative 1. Increase fire spread would increase the odds that fires would encounter areas with high percentages of annual grass. If allowed to burn these areas would be expected to have increased annual grass composition and spatial extent. Fuels objectives in the action alternatives call for suppression or AMR with point or line control to avoid these areas of high annual grass.

It is impossible to know the number of permits that would be relinquished or the amount of area this would encompass. Fire suppression strategies allowed in the action alternatives and the possibility for increased continuity of fuels would allow more acres to be treated and thus meet ARV and FRCC objectives better than Alternative 1.

Special Designation Effects on Vegetation

Wilderness Study Areas (WSAs), ACECs, RNAs, Wild and Scenic Rivers (WSRs) and areas managed for Wilderness Characteristics are designations that generally limit the amount and/or type of vegetation treatments. In these designations fire treatments are allowed; however, fire is a less precise tool than mechanical treatments. The ability to specifically target species, size classes, or effect desired change is limited under these special designations. This is particularly true in Phase III juniper and forested stands. Grassland Biophysical Settings (BpSs) are very fire adapted systems and prescribed fire would be sufficient to remove encroaching woody overstory vegetation. Many of the grassland sites are influenced by undesirable annual grasses and fire will exacerbate this condition. Mechanical seeding can re-establish desirable perennial grasses and reduce annual grasses; however, it would precluded in WSA, RNA, and Wilderness Characteristic areas.

In areas managed for Wilderness Characteristics, proposed fuels treatment projects would be evaluated on a case-by-case basis to ensure that any reductions in Wilderness Characteristics are temporary, and Wilderness Characteristics are protected over the long term. Vegetation treatments in ACEC/RNAs would not be limited to prescribed fire, but mechanical treatments would be used sparingly to meet objectives. WSRs would require more restrictive logging practices.

Under Alternative 1, there are 95,755 acres of VRM Class I (WSA) and no additional areas protected for Wilderness Characteristics, no new areas of WSR (42,847 existing) and no new ACEC/RNA designations.

Areas designated for WSA and VRM 1 management will continue in all alternatives, and will restrict the use of mechanical treatment. Many of the current WSAs have been experiencing juniper expansion for the last 20+ years. These stands are at, or moving toward Phase III juniper conditions. Within the last 10 years the majority of WSAs have been treated with prescribed burns. In general, north aspects that retain more moisture have burned and grass and shrub return has been excellent. Flat and South aspects have in most cases not burned or have grown back with a higher than desired level of annual grass.

Through time the increase in herbaceous conditions on North aspects may increase the amount of natural fire and further reduce the extent of juniper domination. The more likely case is that as these stands continue to grow, the understory vegetation will continue to decline, thus increasing the fire intensity necessary to support fire spread through the stands. This presents many risks to management. Higher intensity fires are harder to control, resulting in greater risk to fire fighter safety, potential damage to property or structures, excessive fire size , more homogonous burns (reducing stand diversity), and a higher risk of annual grass dominance.

Under Alternatives 2 -5, 11,929 acres of additional areas managed for Wilderness Characteristics, 50,475 acres of WSR, and 6,639 acres of RNAs would be designated. The effects of VRM Class I (WSA) are the same as those described for Alternative 1. The 11,929 acres that will be managed to retain Wilderness Characteristics will have the same effects as those described for WSAs for Alternative 1.

In the action alternatives the Big Canyon area (1,157 acres) contains forest vegetation and would be managed to protect its Wilderness Characteristics, including the maintenance of large structure trees. Sensitivity to wilderness quality would dictate that these areas are treated using methods which ensure that any reductions in wilderness character are temporary, and wilderness characteristics are protected over the long term. This would increase the costs associated with tree removal and may make the cut material uneconomical to remove. If this is the case, prescribed fire would be needed to reduce fuel loadings to reduce the risk of insects and disease.

The proposed RNA under Alternatives 2-5 is located at the top of the Black Canyon drainage and is a mix of forested and rangeland communities. Management direction allows for treatments that enhance the values for which the RNA was proposed. The RNA exists within the Sutton Mountain WSA so additional restrictions would apply to the ability to utilize prescribed fire to meet RNA objectives. Unless Sutton Mountain WSA is removed from consideration as wilderness it is unlikely there would be a difference in the long term impacts to vegetative seral structural conditions.

WSR designation proposed in the acquired lands along the North Fork John Day River would allow forest health activities; however, the logging practices may be restricted to meet visual quality objectives. This could limit the feasibility of commercial timber sales which would reduce the amount of area economically feasible to treat. Untreated stands would have greater potential for stand replacement fire and insect outbreaks with increased risk to adjacent stands in the watershed.

The additional areas of VRM 2, WSR, and Wilderness characteristics designations in the action alternatives will decrease the likelihood of balancing ARV needs in these areas. Lack of targeted forest health treatments will increase the amount of shade tolerant species and fuel loadings through time adding to the existing surplus of these conditions.

The action alternatives designate more acres than Alternative 1 where the full range of management tools are not available. This increases the difficulty of meeting the vegetative objectives of these areas and balance ARV objectives across the landscape.

OHV Effects on Vegetation

In general, off road OHV use increases the risk of noxious weed spread. Under Alternative 1, there are 258,064 acres of areas open to OHV use. Under Alternatives 2, 3, 4, and 5, there are 4,088, 4,688, 2, and 0 acres respectively open to OHV use. Due to large acreage open to OHVs and it's spatial distribution across the plan area, there is much greater risk for the spread of noxious weeds, annual grasses, and invader species to every BpS under Alternative 1 than Alternatives 2-5.

Under the action alternatives, by reducing the size of OHV open areas it would be easier to control noxious weed infestations by preventing OHV users from driving through infested areas and then into un-infested communities. Approximately half of the acres designated in Alternatives 2 and 3 as Open to OHV use are forested communities with overstory tree shading and less potential for persistent weed populations. Illegal OHV activity would still be expected, but the amount and distribution of off road OHV use is expected to be much less in the action alternatives than in Alternative 1.

Land and Realty Effects on Vegetation

Compared to Alternative 1, the action alternatives will serve to block up lands so that vegetation management is easier, and larger patch sizes can be managed, thus making it easier to achieve vegetation health objectives.

Integrated Effects on Vegetation Community Characteristics

Table 4-6 summarizes differences in management direction between alternatives that could affect finer scale vegetation community characteristics.

Alternative 1 only provides general direction for the protection of fine scale community characteristics, while the action alternatives refine the guidance and make it more specific to plant communities and current science. For example, under Alternative 1, management direction for within community fuel loading could result in excessive fuel loading in dry forest types and too little down wood in moist forest types. As such, the action alternatives are likely to result in greater protection and maintenance of within-community characteristics necessary for overall landscape health than Alternative 1. The risk of stand replacing loss or conversion to invasive species would be lower under the action alternatives. In particular this direction would increase the potential to attain late and large structure components in the dry forest BpSs and mid seral conditions in shrub with tree potential BpSs.

Table 4-6. Summary of differences in management direction between alternatives for within vegetation community characteristics.

	Alternative 1	Action Alternatives
Biological soil crusts	Provides evaluation criteria for biological soil crusts in the Rangeland Standards and Guides but contains no Standards or BMPs.	Provides BMPs for the retention and restoration of biological soil crusts.
Leave islands and patches	Requires 4.5% of treatment areas to be left untreated for wildlife cover and provides general direction to create diversity and uneven edges.	BpS descriptions provide patch size and leave island guidelines.
Fuel loadings	Current plans provide fuel loading BMPs that are not specific to vegetative communities.	Proposes fuel loadings specific to tree dominated communities, including size class requirements, such as large woody debris needed for wildlife.
Canopies and % cover	Current plans provide no direction for number of canopies or % canopy closure.	BpS descriptions provide appropriate canopy numbers and canopy closure ranges.
Snags	Manage at the 60-70% of Viable Populations.	Proposed direction provides snag sizes, types, and amounts specific to plant community (See Appendix S).

Other Effects

Future management on private, Forest Service, State, and other land is assumed to be very similar to current management. The Forest Service Schedule of Proposed Actions (SOPA) is indicative of the types of management actions which are likely to continue into the future throughout the plan area. The majority of vegetative treatments include thinning from below, under burning, small forest products (post, poles, and firewood), salvage, hazard tree removal, noxious weed treatment and juniper reduction. The majority of forest lands in the plan area are administered by the Forest Service (Ochoco, Malheur and Umatilla National Forests.) Vegetation management direction for the Forest Service is very similar to BLM. The trend for forested vegetation would be the reduction of sapling to small log size material generally from the understory. This should help the plan area as a whole move toward ARV.

Private land treatments are similar; however, more of the large structure trees are removed. Private land managers will in general continue to recover the value of dead and dying timber consumed in wildfires.

Planning

The Forest Service will eventually update their forest plans for the Umatilla, Wallowa-Whitman, Malheur and Ochoco National Forests. This will afford an opportunity to address issues similar to those addressed in this BLM plan. Forest Service plans are not likely to propose radical adjustments from current land management (except for complying with updated travel management regulations), but are likely to add flexibility and resource protection.

The combination in the action alternatives to limit most OHV use to designated routes, close allotments to grazing where necessary, and implement ecologically-appropriate vegetative treatments will together increase the likelihood of reaching ARV objectives over existing management (Alternative 1). The action alternatives will also better facilitate the use of AMR (WFU), and reduce the potential for spread of noxious weeds.

All alternatives have BMPs that would limit the impacts of multiple treatments on any one piece of ground.

Special Status Plants

Introduction

Analysis of the environmental consequences of the alternatives on areas with Special Status Plants considered the following key resources or resource uses: Noxious Weed Control, Fuels and Fire Management, Wild Horses, Wilderness Characteristics, Special Designations, Livestock Grazing and Recreation (OHV use).

Unless discussed below, actions proposed under any of the alternatives would have no effect on Special Status Plants. Established protocols and procedures, as outlined in preceding chapters and listed as Best Management Practices, would result in the protection of known Special Status Plants during implementation of projects and would help to insure there is not a trend toward Federal listing. Ongoing activities (for example, livestock grazing and OHV use) could have an effect on plants, whether or not sites were identified.

Indicators of effects to Special Status Plants include number and acres of sites (percent of suitable habitat occupied) and number and vigor of individuals per site (reproductive health). For most sites, the size in acres is not a good measurement of effects, as most sites are small and significantly less than one acre in size. Exceptions would be some sites of transparent milkvetch.

Special Status Plants Assumptions

- 1 Established weed control protocols would be followed (with botanical surveys prior to treatment) and a reduction in noxious weeds would be beneficial for native plants on site.
- 1 Control lines for fire and fuels management would utilize existing roads and/or topography; no mechanical surface disturbance would occur.
- A resource advisor (knowledgeable of any known sites of special status plants) would be employed during any action requiring the construction of control lines, fire camps, helipads, and other fire management activities.
- 1 For the three Special Status Plant species documented in the plan area, fire is believed to be compatible (in the case of arrowleaf thelypody, documented), if not beneficial.
- 1 Removal of increasing western juniper and other woody vegetation from a site would be beneficial to the remaining herbaceous species on site.
- 1 Special Status Plant conflicts with wild horses are limited to the Murderer's Creek HMA The effects of wild horse use includes both the grazing of plants and soil disturbance through trailing. Horses would be managed to the AML established for the HMA.
- 1 Management of an area for Wilderness Characteristics would limit disturbances to the area.
- 1 Designation of an area as an ACEC could provide restrictions on activities which would protect Special Status Plants; designation of an area for its visual quality would restrict surface-disturbing activities.
- 1 The timing, intensity and duration of livestock grazing is not expected to be increased beyond current levels. Dwarf evening-primrose and transparent milkvetch are not normally affected by grazing so much as by trailing, loafing, or salting. Arrowleaf thelypody is palatable to livestock and inhabits stream/riparian areas, and is therefore highly susceptible to grazing impacts.
- 1 OHV use in the plan area is likely to increase over the next ten years.
- 1 OHV use in a plant site is detrimental to that site; designation of open "play areas" would result in an increase in off-site OHV use unless tightly monitored; limiting OHV use to designated routes would decrease OHV use on plant sites, assuming there is vigorous compliance.

Analysis of the Effects of the Alternatives on Special Status Plants

Noxious Weed Management Effects on Special Status Plants

Noxious weeds threaten all native plant communities and have been documented in many Special Status Plant sites. Under all alternatives, noxious weeds would be aggressively controlled where they occur in Special Status

Plant sites, and there are no substantial differences in effects between alternatives. In the short term, aggressive control could result in "collateral loss" to plants that may be inadvertently sprayed or otherwise impacted. Based on past experience, which included spot treatment of individual weeds, shielding of adjacent Special Status Plants from chemicals, and using manual techniques as opposed to chemical treatment where feasible, it is estimated that less than one percent of the Special Status Plants at any one site would be affected. In the long term there would be an increase in all indicators, especially those relating to the reproductive health of plants in affected sites under all alternatives. At the present time, only arrowleaf thelypody sites appear to have noxious weed issues.

Fuels Management Effects on Special Status Plants

In most cases projects are surveyed prior to implementation of fuels management projects, so documented plant sites can be protected or managed as needed, especially for mechanical treatments. Under all alternatives, concerns relate to the effect of fire treatment on plant sites not discovered during inventory.

Under all alternatives fuels management projects would continue. Due to the scarcity of fuels in transparent milkvetch and dwarf evening-primrose sites, it would be unlikely that any treatments would have an effect on these species. For arrowleaf thelypody the situation is different. Numerous sites, perhaps 40 of the 46 existing sites, (60 of the 74 occupied acres), have a buildup of woody species that need to be reduced either through mechanical means or by fire. Under all alternatives, treatment of these sites would result in an increase in number of plants per site and an increase in reproductive health. In some cases additional historic habitat would be released, resulting in the re-establishment of plants and increasing occupied habitat by 25% to about 90 acres. The action alternatives (Alternatives 2-5) may have greater positive effects on Special Status Plants than the no action alternative (Alternative 1) based on the greater number of acres planned for fuels treatment under the action alternatives (see Table 4-4).

Fire Management Effects on Special Status Plants

Under all alternatives, the effects of fire management on Special Status Plants would be similar to those resulting from fuels management. Assuming protocol is followed, associated surface-disturbing actions would have no effect on Special Status Plants; however, unknown sites could be damaged. There is no way to estimate how many unknown sites might be damaged through surface-disturbing (non-fire) actions, but it would likely be less than one percent of all existing sites under all alternatives. Since these sites are not documented previously, there would be no way to assess if they would be affected by fire management activities in any case.

Wild Horse Effects on Special Status Plants

Under all alternatives, the number of horses in the Murderer's Creek HMA would be reduced to the established AML. This would result in a decrease of horse use in transparent milkvetch sites, primarily related to trailing, which would cause an increase in plant reproduction. While all 22 known BLM transparent milkvetch sites are likely accessible to these horses, horse use has been documented on four, totaling about 69 acres. At least these four sites would be affected and it is likely a number of undocumented sites would benefit as well, with perhaps 20% of the sites (both documented and undocumented) receiving less use by horses. No substantial differences in effects of wild horses on Special Status Plants are likely between alternatives.

Wilderness Characteristics Effects on Special Status Plants

Of the areas proposed under the action alternatives for management of Wilderness Characteristics, only the Clark Canyon area is known to contain Special Status Plants, with four known sites of arrowleaf thelypody, totaling about eight acres. Under Alternative 1, with no direction for management of areas with Wilderness Characteristics, these sites would continue to be vulnerable to surface disturbing activities although none are threatened at the present time. Managing areas for their Wilderness Characteristics under the action alternatives would provide additional protection for these sites since surface disturbing activities would generally not be allowed. Any increase in non-motorized use would likely have minimal effects on Special Status Plants since the sites are remote and difficult to access.

Special Designation Area Effects on Special Status Plants

For ACECs that are currently designated under Alternative 1, there are no impacts to Special Status Plants, because Special Status Plants are not known or suspected in these areas. Under the action alternatives, designation of the Black Canyon ACEC/RNA and subsequent elimination of livestock grazing from this area would provide some additional protection for six sites (14 acres) of arrowleaf thelypody, or approximately 13% of the known BLM sites. Since this area is not now grazed to any large degree, the actual short-term benefits to the populations would be expected to be minor. However, in the long term these sites would be assured of continued protection from grazing. At the present time, approximately 60 sites of arrowleaf thelypody are documented worldwide (Vrilakas, pers. comm.), with only one fenced from livestock grazing, and so protection of these six sites would be noteworthy. Additional sites within the Painted Hills CAMP of the John Day Paleontology ACEC would not be affected through this designation since this ACEC is not proposed to protect plants. Additionally, a large portion of the proposed CAMP includes the existing Sutton Mountain WSA which contains numerous plants that would benefit from Interim WSA Management. Special Status Plants are not known for the other ACEC proposals under the action alternatives.

Livestock Grazing Effects on Special Status Plants

Of the 69 documented Special Status Plant sites in the plan area, only one, an arrowleaf thelypody site, has been observed to be in a downward trend related to livestock grazing, and the impacts have been caused primarily by loafing. These impacts would likely continue under all alternatives unless this site was fenced. Management direction under all alternatives calls for taking action to avoid listing of sensitive species. For all other sites, grazing would continue to have no discernable impacts, although it is unclear if livestock grazing is affecting the ability of certain sites to expand into adjacent, suitable habitat.

Under Alternatives 2, 3 and 5, certain allotments are designated to be closed or allocated as Reserve Forage Allotments if permits are relinquished (IPR). This would affect 17 allotments containing 54 documented Special Status Plant sites (22 transparent milkvetch, 1 dwarf evening- primrose, and 31 arrowleaf thelypody). Removal of livestock grazing from these sites would have no effect on transparent milkvetch or dwarf evening-primrose since these plants are not in sites normally grazed by livestock. Since most of the arrowleaf thelypody sites are in situations where livestock grazing is not a factor (i.e. sites are generally inaccessible to livestock or only lightly grazed) there are likely to be no effects to these sites. However, it is probable that removal of grazing from these allotments would allow the re-establishment of arrowleaf thelypody in at least some habitat that is not now occupied due to existing grazing pressure. Conceivably the amount of occupied habitat in these allotments could more than double, from an existing 44 acres to 100.

Under Alternative 4, five allotments containing special status plants would be closed to livestock grazing while 12 would be closed if the grazing permit were relinquished (IPR), affecting 56 documented sites, (22 transparent milkvetch, 1 dwarf evening- primrose, and 33 arrowleaf thelypody). Although two more arrowleaf thelypody sites would likely be protected from grazing under Alternative 4, the impacts would be nearly identical as for Alternatives 2 and 3.

OHV Use Effects on Special Status Plants

Under Alternative 1, OHV impacts (off-highway vehicles used off-road) would continue on affected plant sites and likely increase at others. At the present time, two sites have been documented to have current OHV use: a small (< 1 acre) site of arrowleaf thelypody near Kimberly, and a larger (12 acre) site of transparent milkvetch along the South Fork John Day River. OHV use in the arrowleaf thelypody site is primarily related to an OHV trail crossing the drainage. However, due to the transparent milkvetch's preference for open, gravelly slopes, its habitat is ideal for OHV use, at least from a recreational perspective, and OHV use would likely continue or even increase under Alternative 1. Approximately 250 acres, encompassing 12 sites, would remain threatened with OHV use. This is approximately 72% of the documented habitat of this species.

The action alternatives would at least restrict OHV use to existing roads and trails in the South Fork area. Even though many of these sites are adjacent to such routes, OHV threats to transparent milkvetch would be less under the action alternatives than under Alternative 1 assuming user compliance and agency enforcement.

Two recreation areas designated under the action alternatives would potentially affect Special Status Plants in the plan area. The Clark Canyon area, a subunit of the Bridge Creek SRMA, would be closed to OHV use under the action alternatives. This would help to protect four sites (12 acres) of arrowleaf thelypody known in the area.

Also proposed under the action alternatives are one or more Class II technical rock climbing areas immediately north of the John Day River between Service Creek and Kimberly. These proposed technical areas are presently open to OHV use and as a result there are isolated, ongoing impacts to plants as noted for Alternative 1. These areas would be designated as limited to designated routes under the action alternatives. Depending on which areas would be designated, up to 15 known arrowleaf thelypody sites (approximately 29 acres) could be affected. Due to the technical designation and resultant increase in public use, illegal OHV use would be expected to increase in the vicinity of these areas under the action alternatives. If OHV compliance was closely monitored, plant sites would likely be more secure under the action alternatives since under Alternative 1 the areas are "open."

Other Effects

Implementation of any of the action alternatives would result in positive cumulative effects to Special Status Plants. These effects would be directly related to an increased number of plant sites protected from livestock grazing, OHV use and other activities, as well as enhancement of sites through fuels treatments.

Invasive Plants

Introduction

Analysis of the environmental consequences of the alternatives on invasive plants (noxious weeds) considered the following key resources or resource uses: Livestock Grazing, OHV use, Wildlife, Transportation Management, Vegetation Management, and the Aquatic Management strategies.

Indicators used to compare environmental consequences between alternatives include: potential for, or resistance to weed introduction and spread.

Invasive Plant Assumptions

- 1 The management of noxious weeds will take the same approach for all alternatives.
- 1 The risk for expansion of weed infestations will be commensurate with the amount of disturbance on the landscape, which will vary among alternatives. For example, if more acres of vegetation rehabilitation are contemplated using mechanical treatments such as seeding or non-mechanical treatments such as prescribed fire, the potential for weed expansion will increase.
- 1 Alternatives which include more restrictions on weed control activities will likely result in increased costs or in the reduction in the effectiveness of treatment methods. Hand wiping of chemicals on individual plants is much more expensive that spot spraying of chemicals (e.g., in riparian and aquatic habitat).
- 1 Special area designations which restrict available weed management tools will also likely result in increased costs or in the reduction in the effectiveness of treatment methods. For example, if we do not allow a ground application of chemicals from an ATV in Wilderness Study Areas, costs for weed treatments will be greater than if ATVs were allowed.
- 1 The recreational use of OHVs will serve to expand weed infestations. Alternatives which restrict the area available to OHV use will have a lower potential for weed expansion than those in which larger areas are available for OHV use. Special OHV play areas increase the potential for weed expansion both within these areas and outside them.
- 1 Surface disturbance from mineral extraction increases the potential for weed expansion. This type of surface disturbance necessitates weed control measures in Plans of Operation with related increases in costs.
- 1 Traditional plant gathering areas could be adversely impacted by weed control activities if these areas are not fully identified prior to treatment.
- 1 Projected acres of noxious weed treatment by alternative are not quantified since current inventories of noxious weeds are incomplete.

Analysis of the Effects of the Alternatives on Invasive Plants

Livestock Grazing Effects on Invasive Plants

Alternatives 2, 3 and 5 would reduce the acreage open to grazing as compared to Alternative 1 but would not reduce the acreage as much as Alternative 4. Since planned grazing often reduces weed spread, it is likely that weed infestations would increase more under management prescribed in Alternatives 2 and 3 compared to Alternative 1 but not as much as in Alternative 4. However along streams, springs, ponds and livestock trails, the potential for weed spread would be greatest under Alternative 1 and least under Alternative 4.

OHV Effects on Invasive Plants

Alternative 1 has the greatest probability for the spread of noxious weeds due to relatively greater OHV use. This probability would be lower under the action alternatives due to the larger areas of limited and closed road designations.

Wildlife Management Effects on Invasive Plants

Weed spread related to wildlife is directly tied to the use of OHVs in the pursuit of hunting opportunities. The effects of the alternatives in this respect are similar to those described above for the effects of OHV use.

Transportation Management Effects on Invasive Plants

The fewer miles of open road system, the lower the potential for weed infestations to increase. Alternative 3 has the longest distance of open roads, followed by Alternative 1. Alternatives 2, 4 and 5 have the lowest distance of open roads and hence the lowest potential for increases in weed infestations. Another effect, however, is that as road densities are reduced, the cost and difficulty of weed control activities increases due to reduced vehicular access.

Vegetation Management Effects on Invasive Plants

Alternatives 2, 3, 4 and 5 would treat vegetation on 177,000 acres over 30 years which would result in the potential for the spread of noxious weeds. Since vegetation treatments would largely be designed to improve ecological condition on treatment areas, after a post-project period of stabilization, all of the action alternatives would have a resistance to future invasions. Alternative 1 would schedule vegetative treatments on 108,000 acres and these would have nearly the same potential as Alternatives 2, 3, 4 and 5 for weed increases and resistance in the future after stabilization.

Aquatic Management Effects on Invasive Plants

Riparian area management generally restricts implementation of such activities as weed control. As riparian management area acreage increases the cost and difficulty of control efforts increase correspondingly. Alternative 1 has a standardized riparian area width of 300′ along fish bearing streams. The action alternatives, through the Aquatic Conservation Strategy, take a site-specific approach to designation of riparian management areas and identification of management actions necessary to meet aquatic goals, including eradication of noxious weeds. As such, the action alternatives are more likely to attain aquatic objectives than Alternative 1.

Fire and Fuels

Introduction

Analysis of the environmental consequences of the alternatives on fire and fuels considered the following key resources or resource uses: Fire and Fuels Management, RNAs, Wildlife, Lands and Realty, Visual Resources, Air Quality, Recreation (OHV use), Management for Wilderness Characteristics, and Access and Travel Management. Livestock Grazing effects on fuels are discussed in the vegetation section of this chapter.

Indicators used to compare environmental consequences between alternatives include: risk of uncharacteristic fire, area proposed for treatment, opportunities for use of AMR including wildland fire use, access for mechanical fuel treatment, amount of prescribed fire or suppression, fire hazard, fuel loading, risk of uncharacteristic fire, and potential for human-caused ignitions. The assumptions and indicators include:

Fire and Fuels Indicators

- 1 **Risk of uncharacteristic fire from fuel loading (Fire Regime Condition Class or FRCC).** Fire is a natural process; exclusion of fire may result in continued accumulation of fuel leading to fires with uncharacteristic behavior and effects. Changes to native plant communities from past management actions such as fire suppression, road building, agricultural and urban conversion of wildlands, timber harvest, and grazing have all contributed to the current altered fire environment. As fuel loads increase, so does the risk of fire. However, it is not desired, nor possible to restore every acre of federal land within the plan area to a Fire Regime Condition Class 1. In some areas, managing for FRCC 2 and 3 vegetative structure meets other resource objectives. None of the alternatives would eliminate wildland fire from the ecosystem.
- **Area proposed for treatment.** Restricting the use of treatments would limit the reduction of hazardous fuels. Increasing the area of treatment increases the area attaining fire and fuels objectives.
- 1 **Opportunities for use of Appropriate Management Response (AMR), including wildland fire use (WFU).** Increasing areas zoned as available for us of AMR and WFU increases the area where fuel levels attain fire and fuels objectives with decreased human interference. Levels of treatments proposed through AMR and WFU may range considerably from year to year, as the frequency and occurrence of unplanned fire starts in a given year is unpredictable. Wildland Fire Use and AMR decisions will be guided by many variables including but not limited to weather, national and local preparedness levels, time of year, fuel conditions, and line officer approval.
- 1 **Amount of fuels treatment.** Averaged across the plan area, decreases in accessibility would decrease the likelihood of mechanical fuels treatment. Increased restrictions would decrease the likelihood of fuels treatment. Choices about how to access and prioritize fuels restoration and maintenance projects involve considering multiple objectives at the landscape scale, including reduction of risk at the WUI, and enhancing or maintaining sustainable habitats, watersheds, visual resources, and recreational, social and economic opportunities.
- 1 A**mount of prescribed fire or suppression.** WUI currently occupies 85,391 acres of BLM land in the plan area, and it is expected to continue its expansion. WUI acres within the plan area are expected to increase with new rural housing development.
- **Flame length and fire hazard.** Flame length is an indicator of fire hazard. This analysis assumes ground suppression forces can operate safely adjacent to flames that are 4 feet in length or less. Extreme fire behavior, including crown fire, rapid surface spread, and long-range spotting, creates an unsafe environment for firefighters and the public. Fuels treatments on federal lands alone will rarely improve the chances for safe and successful community protection if the homes to be protected are surrounded by fuel on the private property, and the structure itself is constructed of extremely flammable materials. The most effective community protection strategy is to have a fire-safe structure, surrounded by vegetation on the private property that will burn with low intensities, surrounded by wildlands (regardless of ownership) that are managed for low-intensity fire behavior
- **Potential for human-caused ignitions.** Maintaining or designing a vegetative environment that reduces fire hazard, including species and structural characteristics will produce safely manageable fire behavior in the event of an unplanned ignition.

Analysis of the Effects of the Alternatives on Fire and Fuels

Effects Common to All Alternatives

Proposed management of the following resources and resource uses are not anticipated to have impacts to fire and fuels: Aquatic Resources, Wild Horses, Cave Resources, Native American Uses, Paleontological Resources, Cultural Resources, Energy, Mineral Resources, and Lands and Realty.

Fire and Fuels Management Effects on Fire and Fuels

Approximately 97 percent of BLM-administered lands within the plan area currently fall into a FRCC of 2 or 3, as estimated using local data and the LANDFIRE FRCC Mapping Tool.

Under Alternative 1, prescribed fire would be carried out with an approved burn plan, but there would not be any direction for targeting the location of fuels treatments or how to prioritize fuel treatments. If all fires are fully suppressed, as specified under Alternative 1, fuels would continue to build up and increase the risk of uncharacteristic wildfire. Appropriate Management Response would not be an option in Alternative 1. Under Alternative 1, treatment of approximately 3600 acres of BLM land per year (see Table 4-4) would move the Fire Regime Condition Class from a 3 or 2 toward a 2 or 1, or maintaining acceptable fire regime conditions. Under Alternative 1, fire suppression efforts would reduce the area of fuels treated by naturally ignited fire.

Under Alternatives 2-5, treatment of approximately 5900 acres of BLM land per year (see Table 4-4) would move the Fire Regime Condition Class from a 3 or 2 toward a 2 or 1, or maintain condition class. Less aggressive responses to unplanned fires, including WFU would be implemented. Fuels treatment prioritization criteria in Alternatives 2 -5 seeks to identify areas where vegetation treatments would allow the full range of AMR (wildland fire use to full suppression) to be available for management. As this approach is applied, the opportunity for treatment through AMR would increase.

Table 4-7 displays differences between alternatives in the amount of the plan area zoned into three fire management categories: Wildland-Urban Interface (WUI), Full Suppression, and AMR. Under Alternative 1, full suppression would be implemented for all wildland fire ignitions on BLM lands, whether they fall within the WUI or not. Under Alternatives 2-5, a "Full Suppression Zone" has been identified around communities and improvements. This includes, but is not limited to, areas that have developed a Community Wildfire Protection Plan (CWPP) and incorporates areas that have been identified by the State of Oregon as WUI. The area in WUI is larger under Alternatives 2-5 than Alternative 1. Under Alternatives 2-5's broader definition of WUI, prescribed fire, mechanical treatments and AMR could be used to restore fire's ecological role and reduce fire hazard to communities. The increased area of AMR under the Alternatives 2-5 would increase the opportunity for use of AMR and WFU when wildfires occur.

Table 4-7. Suppression strategies by zone in acres.

Category*	Zone size in acres	
	Alternative 1	Alternative 2-5
Wildland-Urban Interface**	22,304	85,391
Full Suppression Zone	N/A	22,304
Appropriate Management Response Zone	N/A	434,306

* Categories are not mutually exclusive and may not cover the entire plan area.

** Wherever residential, industrial, or agricultural structures are located within or adjacent to trees and other combustible vegetation.

Table 4-8. Relative Fire Hazard on BLM lands and across all ownerships in the plan area among alternatives.

Category	Flame Length (feet)	Analysis Area Current (all ownerships)	BLM Lands		
			Current	Alternative 1 2037	Alternatives 2-5 2037
1	0 (no burn)	16%	9%	9%	9%
2	0 - 2	16%	9%	11%	13%
3	2- 4	24%	25%	39%	47%
4	4 - 8	40%	56%	39%	29%
5	8 - 11	<1%	<1%	<1%	<1%
6	11 - 20	1%	1%	1%	<1%
7	20+	3%	1%	1%	1%

Table 4-8 and Figure 4-1 display the output from the FlamMap Model (Finney and others 2004) for flame lengths for BLM lands and the entire planning area (all ownerships). The table displays the current situation as well as the projected fire hazard for the year 2037 for each alternative. This analysis assumes that prescribed fire treatments would reduce anticipated flame lengths by one category, and that mechanical treatments (i.e., in forest fuels) would reduce the flame length by two categories. Rangeland prescribed fire treatments would occur in category 4 and forest prescribed fire would occur in category 3. Appropriate Management Response and WFU (proposed in Alternatives 2-5) would be implemented evenly across the flame length categories of 3 and 4 (2-4 feet and 4-8 feet respectively). Mechanical treatment in the forest type would be spread between categories 4, 5, 6, and 7. Mechanical treatment in the rangeland would not alter fire hazard.

Based on proposed levels of fuel treatments (see Table 4-4), all alternatives similarly reduce fire hazard (flame lengths) across BLM lands in the plan area. By 2037 flame length categories 1-3 (< 4 feet) will be 59% and 69% for Alternative 1 and the action alternatives, respectively.

Air Quality Effects on Fire and Fuels

Air quality restrictions are similar across all alternatives and may cause some short term delays in the implementation of fuels projects. However, they are not expected to reduce the area of fuels treatment.

Research Natural Area Designation Effects on Fire and Fuels

Under all alternatives, prescribed fire treatments would be allowed in RNAs, but under more stringent conditions than elsewhere. More stringent conditions may increase the difficulty of implementing a prescribed burn within or near an RNA. Most of the RNAs exist in pre–existing WSAs (Wilderness Study Areas) which already prohibit the use of mechanical treatment. Since the action alternatives designate greater area as RNA (6,639 acres), slightly less area may be treated under Alternatives 2-5 than Alternative 1.

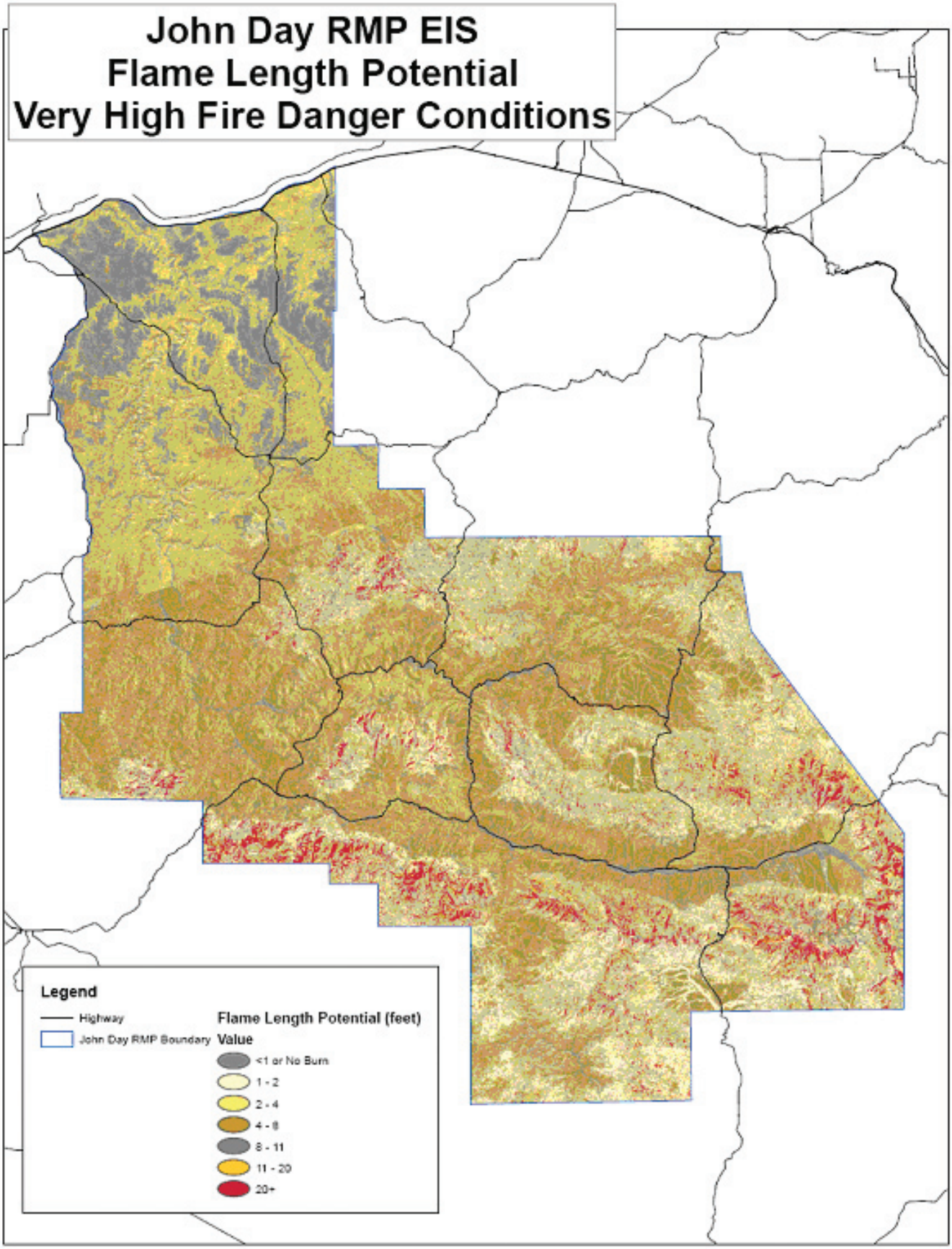
Wilderness Character Effects on Fire and Fuels

Areas managed to protect Wilderness Character would be restricted from use of mechanical treatments, with the exception of Big Canyon. Planned and unplanned fires will provide the fuels treatment in these areas. Sites capable of supporting juniper may move toward phase III juniper succession (see glossary). In forested areas, hazardous fuels buildup may increase the risk of stand replacing and uncharacteristic wildfire. Alternative 1 does not protect areas with Wilderness Character. Management of Wilderness Character would restrict the use of mechanical fuels treatment on 11,929 more acres under Alternatives 2-5 than Alternative 1.

Lands, Realty, and Land Tenure Effects on Fire and Fuels

The criteria for acquisition and disposal of lands proposed under Alternatives 2-5 would result in larger, more continuous blocks of BLM land than Alternative 1. This would facilitate more use of AMR and WFU under Alternatives 2-5 than Alternative 1.

Figure 4-1. FlamMap Fire Hazard for the John Day River Basin plan area.



Visual Resource Management Effects on Fire and Fuels

Assignments of Visual Resource Management (VRM) classifications of Class II increase cost and prohibit broad scale juniper treatment relative to VRM Classes III and IV. This results in limited options for mechanical fuels treatments. VRM classifications only vary by alternatives on acquired lands along the North Fork John Day River and in the areas classified as managed to protect Wilderness Character. The VRM Class II designation in these areas would reduce the likelihood of fuels treatment on 146,304 acres under Alternatives 2-5 and 101,987 acres under Alternative 1 (see Table 4-9). Areas in VRM Class I do not differ between alternatives, and will not allow for mechanical fuels treatment.

Table 4-9. Size of VRM class zones by alternative.

Visual Resource Management Class	Alternative 1	Alternatives 2 - 5
Class I	95,755	95,755
Class II	101,987	146,304
Class III	175,092	164,235
Class IV	83,548	50,285

OHV Use Effects on Fire and Fuels

OHV use can lead to human caused fires. Under Alternative 1, the 258,066 acres is designated as Open to OHV use. Under Alternatives 2-5, off road OHV use will be largely concentrated in designated areas (up to 371,787 acres, depending on alternative). Concentrated use would create the potential for more fire starts in areas designated as Open. Where OHV use is Limited to designated roads and trails, the potential for fire starts would be aligned along designated roads and trails. Under Alternatives 2-5, fewer human-caused ignitions may occur outside of designated trail systems relative to Alternative 1. Under all alternatives, enforcement of existing public use restrictions on OHVs are expected to mitigate the risk of human caused fires.

Wildlife Effects on Fire and Fuels

Under all alternatives, seasonal restrictions for travel may impact the timeliness of the implementation of fuels projects. Impacts would be negligible because most of the closures take place in the winter when access is difficult due to impassable road conditions. In any case, areas with seasonal closures project planners would need to allow for a longer duration of time to complete fuels projects.

Access and Travel Management Effects on Fire and Fuels

Under the action alternatives, the closure of some existing roads may delay suppression efforts. If a road is obliterated or “ripped”, a dozer may be needed to reopen it during a fire incident. Depending on the nature and location of the fire, this may delay suppression efforts longer than under Alternative 1.

Other Effects

The Ochoco, Malheur, Umatilla and Wallowa-Whitman National Forests have increased the acres treated for hazardous fuels reduction and restoration of fire-adapted ecosystems, including prescribed fire use and mechanical fuels treatments. This will result in a potential cumulative effect on fire regimes, vegetation and habitat quality and distribution, including possible degraded habitat opportunities in the short term, followed by improved conditions across the landscape in the long term.

As mechanical and prescribed fire treatments occur across the landscape, ecosystems will tend to be more resilient to broad scale disturbances from fire, with more opportunities to limit wildland fire growth using treated areas as control lines. These actions would also begin to include fire as part of natural ecosystem processes and result in more natural vegetation and ecosystem dynamics across the landscape.

Prescribed burning will produce smoke, but as ecosystems are restored and fire sizes and intensities decrease there is consequently a potential for a decrease in smoke from wildland fires.

Treatment of fuels will also create job opportunities in the contract community since commercial biomass availability may be a by-product of fuels treatments in some areas.

Aquatic Resources

Introduction

Analysis of the environmental consequences of the alternatives on aquatic resources considered the following key management actions and related indicators: Wildlife road density standards, prescribed fire and AMR, Access and Travel Management. Recreation (including OHV designations), Agricultural Land Management, Livestock Grazing, PACFISH goals, Aquatic Objectives, PACFISH buffers, and riparian management areas.

Indicators used to compare and assess effects on aquatic resources include: source water protection, riparian areas restored from uncharacteristic to native vegetation, instream flows, peak flows, bankfull widths, sediment delivered to stream channels, Proper Functioning Condition (PFC) ratings, residual pool depth, pool frequency, stream function limited by roads, riparian vegetation diversity, large wood, and stream function limited by degraded uplands. These indicators were chosen because they describe water quality and general ecological conditions. These indicators consider limiting factors for fish, water quality, and species identified through the BLM Learning Network (see the Wildlife section of this chapter) which are dependent on stream channels, floodplains and lentic areas. Key habitat quantity is a limiting factor for all of the John Day River Basin, while sediment loads are a limiting factor in over 80% of the John Day Basin. Habitat diversity, temperature, and stream flow are the other significant limiting factors (BPA 2005).

Aquatic Resource Indicators

The assumptions and some methodologies underlying these indicators include:

- **Acres of source water protection.** The Source Water Protection Areas (SWPAs) of major municipalities were accurately delineated by ODEQ and the Department of Human Services. The SWPAs include the area which provides domestic water over the course of 20 years. Assuming that surface ownership approximates subsurface ownership, BLM managed lands were only present in SWPAs where the source is ground water (as opposed to surface water). Other (small scale) domestic water sources on BLM lands are mostly springs or reservoirs rarely used for drinking water. Oregon Water Resources Department (OWRD) GIS databases were used to map domestic sources that are not part of a municipality.
- 1 **Acres of riparian areas restored from uncharacteristic vegetation.** Assumptions built into the GIS data used to map vegetation are part of the GIS metadata for this plan. Because of the difference in the mapping scale (large pixels) and relatively narrow shape of riparian areas, the actual amount of uncharacteristic vegetation has a large variance but is assumed to indicate the differences between alternatives. Generally, the uncharacteristic vegetation mapped in riparian areas is assumed to be upland types of vegetation, invasive plants or agricultural fields. Facilities are also found in riparian areas and their footprint occupies space suited for native vegetation. Uncharacteristic vegetation will not result in attainment of the aquatic objective for native riparian vegetation or water quality. Some types of non-native vegetation may achieve objectives for PFC, but will not allow progression to desired conditions of vegetation along stream channels and floodplains.
- **Instream flows measured in cubic feet per second (cfs).** State instream flow goals for the John Day River are assumed to be the flows necessary to support fish and recreation (Lauman 1978). The John Day River and its tributaries yield water from the majority of the plan area. Instream flows are valued for fish, recreation and pollution abatement throughout the basin. The energy and sustenance provided by stream flows is the foundation for all aquatic objectives and is the most defining feature of riparian areas.
- 1 **Percent increase in peak flows by watershed.** A balance among flow energy, sediment supply, and channel resilience must be maintained for the stream network to remain stable (MacRae 1996). A

change in peak flows (stream power) indicates that sediment supply and channel resilience will not be maintained (SCVURPPP 2004). Channels with increased sediment supply and increased peak flows tend to become wider and straighter. If flows are increased, but sediment is no longer available, stream channels tend to become deeper and steeper (incised and removed from their floodplain)(USDI 1998), degrading aquatic habitat. Loss of channel resilience will result in non-attainment of PFC. Altered channel shape and substrate will result in non-attainment of aquatic objectives that are assigned to provide aquatic habitat for locally important fish, native riparian vegetation, instream flows, habitat connectivity, overall channel capability, and water quality to support beneficial uses (John Day Subbasin Assessment 2005). Harris and Hubbard regression equations were used to model the peak flows resulting from changes in forest cover.

- 1 **Percent increase in bankfull width increases by watershed stream.** The majority of the plan area streams are sediment rich. Sediment discharge to streams increases with increased peak flows. Reductions in vegetative cover and increases in peak flows have been observed to result in wider, flatter stream channels over most of the plan area. A small portion of streams, those dominated by fine sediment, have a tendency to become deeper and steeper when peak flows increase, but this is less common. These relationships have been observed through field assessment of PFC and NEPA (EA) documents (e.g., Little Pine Creek and Franks Creek). Increased bankfull width increases the surface area of water exposed to warm air and increases solar input, thus increasing water temperatures. Water temperature is the most common parameter for non-attainment of water quality standards across the plan area. Elevated water temperature is correlated with other water quality impairments such as low dissolved oxygen and acidic pH. Wide, shallow channels lack pool habitat for locally important fish and would not result in the attainment of aquatic objectives for water quality, channel geometry, surface to groundwater interactions, and locally important fish habitat.
- **Fine sediment delivery to stream channels at stream and road crossings.** Delivery of sediment to stream channels reduces the quality of aquatic habitat (Mebane 1999). While sediment is produced on all roads, delivery to streams becomes a function of the distance between roads and streams. The greater the distance, the larger the filtering capacity of the watershed and the less likely that sediment will reach the stream network. Roadside ditches and culverts that deliver flows to streams reduce the filtering capacity of the watershed (Schiess 2004). In general, sediment from roads within 100 feet of a stream crossing is assumed to reach the stream channel. Analyzing distances greater than 100 feet did not vary the proportional differences between alternatives. Water Erosion Prediction Project (WEPP) analysis (see Introduction to this chapter) can be used on a site-specific basis to determine the potential for sediment delivery to streams. The values displayed for "sediment delivery to stream channels" through out this document were modeled using WEPP. The values approximate actual conditions for the plan area. The WEPP model has been used and checked in site specific Environmental Analyses (e.g, Little Pine Creek and Franks Creek) within the plan area. These values are used for broader scale analyses of effects between alternatives.
- **Miles of stream near residual pool depth.** Pool depth is an indicator of broad scale influences affecting aquatic habitat quality. Decreased water velocities in deep pools increases detritus retention and deposition for use by macroinvertebrates (Lemly 2000). Bisson *et al.* (1982) and Nickleson *et al.* (1992) reported a strong preference for deep pools by salmonid fry and juveniles during both summer and winter. Hayman *et al.* (1996) reported high use of this habitat type by 0-age juvenile salmonids (Mobrand Biometrics 2003). During drought or periods of low flow, habitat is reduced. Deeper pools, such as those formed by large wood, provide more habitat for fish and other organisms during these critical periods. Shallower pools may result in higher mortality from predation or elevated water temperatures (Rosenfeld 2000). Many streams in the plan area have interrupted flow (see glossary), and residual pool depth is an important indicator and measure of aquatic habitat quality (Cramer and Ackerman, in review 2008). Residual pool depth information was surveyed using ODFW protocol.
- **Pool frequency.** Pool frequency is assumed to be an indicator of undisturbed, high quality habitat and desired riparian condition. Pools provide thermal refugia (e.g., cooler water in the summer and warmer water in the winter) (Rosenfeld 2000). In undisturbed areas, stream reaches generally have higher pool frequencies (Wood-Smith 1995). In non-forest systems, riparian vegetation and channel meanders lead to pool formation. Pool frequency information was surveyed using ODFW protocol.
- **Miles of stream at PFC.** PFC is an indicator of the basic stream function required to provide for beneficial uses such as fish habitat, water quality, wildlife, and other values. A combination of active and passive

restoration is necessary to achieve PFC, an upward trend in riparian condition, or ARV. PFC indicates that recovery toward potential or site capability is not being limited by BLM management and has achieved a stable physical condition.

- 1 **Miles of stream with roads limiting stream function.** To differentiate between alternative approaches to address the effects of roads on streams, the existing PFC inventory was used to indicate where roads limit stream functions. This is an indicator that helps measure the attainment of the PFC objective as well as aquatic objectives for channel condition, sediment and water quality.
- 1 **Riparian species composition and diversity.** Willows, sedges, and rushes in non-forested streams can effectively dissipate stream energy and provide abundant fish and aquatic habitat. Riparian vegetation is important to the formation and maintenance of pools, side channels, and backwaters. Diverse vegetation provides structural complexity and cover for fish and other aquatic species. Riparian vegetation regulates sediment transport of gravels and organic matter, influencing their effect on other physical and biological processes. As diversity of riparian vegetation increases, so does habitat (Mobrand Biometrics 2003).
- **Miles of stream needing large wood or instream structure in 30 years.** Large woody debris is an important structural component of riverine ecosystems in the plan area. It has key functions in forming channel types and habitat units, particularly in the creation and maintenance of pools, side channels, and backwaters. It provides structural complexity and cover for fish habitat. It regulates the transport of sediment, gravel, and organic matter, influencing their effects within physical and biological processes. The ability of large wood to perform these functions depends in part on its abundance, size, and type of wood, and on the size and geomorphology of the stream system (BPA 2005).
- **Miles of stream where upland influences are degrading stream condition.** Changes in upland watershed condition can influence infiltration, evaporation, and subsurface flow. Plan area PFC assessments indicate where changes in watershed conditions have degraded aquatic conditions.

Analysis of the Effects of the Alternatives on Aquatic Resources

The analyses described herein are focused on actions of potential measurable environmental consequence. The following resource uses under all alternatives will either have no difference in effects on aquatic resources or effects will be eliminated by the use of BMPs: Air Quality, Special Status Plants, Native American Uses, Paleontological Resources, Special Area Management, Minerals, Lands and Realty (including Renewable Energy), Wilderness Character, Wild Horses, Wild and Scenic River designation, and Cave Resources.

Soil Management Effects on Aquatic Resources

Management direction of Alternative 1 to maintain soil productivity and minimize erosion does not specify limits for soil disturbance other than to minimize it and apply BMPs. Thus, it is not possible to quantify effects of Alternative 1 on aquatic resources. Alternative 2 is much more specific in terms of measurable actions and objectives.

This standard under the action alternatives will likely decrease sediment input to stream channels at road crossings and decrease the miles of stream where roads or upland watershed conditions are degrading stream channels. Under Alternatives 2-5, facilities with excess erosion potential are removed or rehabilitated. Implementation and effectiveness monitoring of BMPs minimizes the risk, but does not eliminate the potential for sediment input to streams (Rashin 2006). Therefore, under Alternative 1, the risk of sediment delivery to streams would increase over the life of the plan. Under Alternatives 2-5, the risk of sediment delivery would remain constant over the life of the plan.

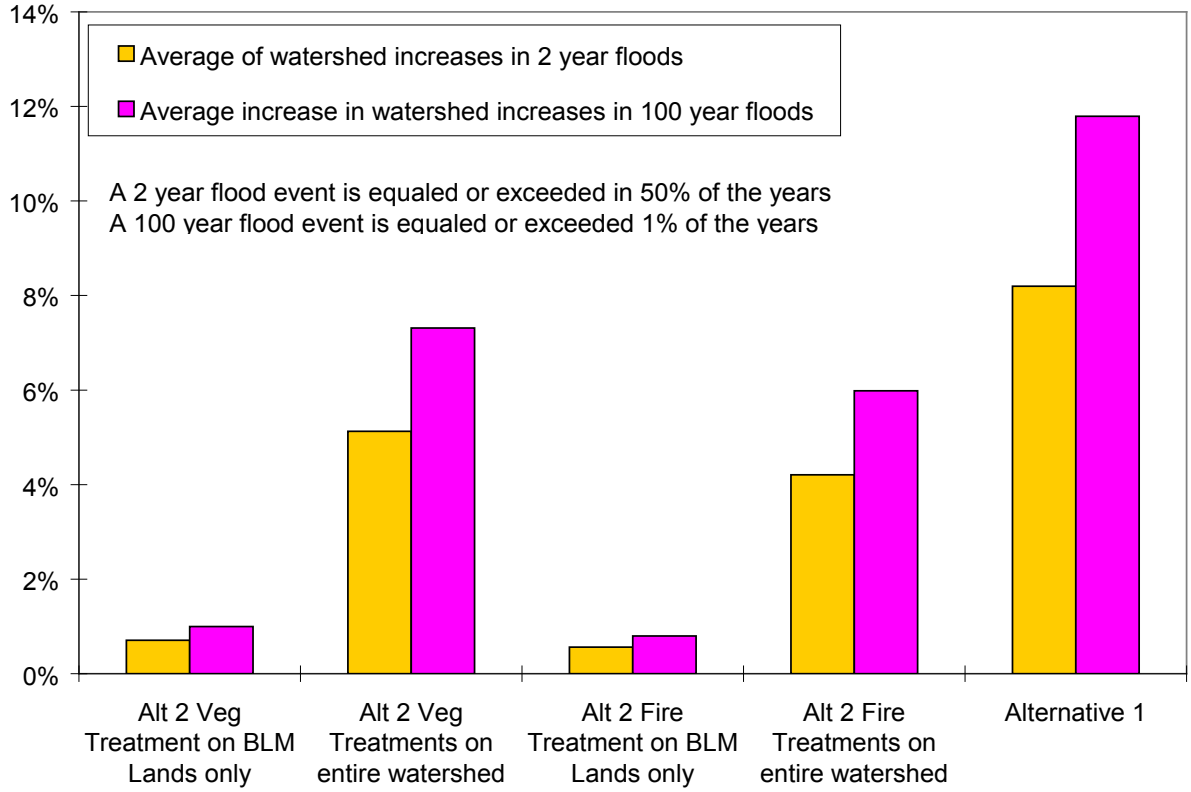
Vegetation Treatment Effects on Aquatic Resources

Vegetation treatment under Alternative 1 is more likely to remove a larger proportion of forested watershed cover than Alternatives 2-5. Alternative 1 is focused on commercial timber production, limited treatment and wildfire suppression. These factors will likely result in broad scale removal of forest watershed cover through uncharacteristic wildfire or timber harvest. Alternatives 2-5 accelerate vegetation treatment but remove less forested watershed cover over time because treatment areas would be smaller. A reduced risk of fire as a function of vegetation management under the action alternatives would lead to less catastrophic loss of cover from across the landscape compared to Alternative 1. Fuels and vegetation treatments to achieve ARV under Alternatives 2-5

will maintain large overstory trees, and prescribed fire and vegetative treatments will mimic natural disturbances. Alternatives 2-5 recognize that all seral stages are integral to watershed function. Vegetation management under Alternatives 2-5 would move 58 miles of stream toward PFC by restoring upland watershed conditions that currently contribute to non-attainment of standards.

Peak flows were modeled for 5th field watersheds (up to 250,000 acres) in the plan area. Increases in peak flows at various return intervals are displayed in Figure 4 -2. Alternative 1 increases peak flows more than Alternative 2. However, peak flow increases are generally short lived because of restoration of watershed cover within approximately 10 years (Lewis 2001). This quick recovery limits the amount of time watersheds are at risk to increased peak flows from major precipitation events.

Figure 4-2. Components of increases in peak flows as a result of vegetation and fire treatments for 2 year and 100 year floods between alternatives.



Although removing forest cover has been observed to increase peak flows, it is important to note that none of the alternatives increased peak flows beyond the variance of the peak flow model (Hubbard and Harris 1978, Grant *et al.*, in press). Channel width will increase half as much as peak flows increases.

Alternative 1 includes general standards for vegetation treatment. Some prescriptions for improving watershed cover are included in existing RMPs. Under the action alternatives, vegetation treatment standards are tied to aquatic objectives. As a result, they better compliments aquatic objectives. Implementation of the standards and BMPs would benefit riparian conditions.

Broad species diversity of native riparian plants would be a consequence of Alternatives 2-5. Implementation of the action alternatives would enhance 113 miles of stream that would not be affected under Alternative 1.

Vegetation management under Alternatives 2-5 is more likely to increase the amount of older aged forests than Alternative 1. Model results illustrate that fish overwintering in streams among older-aged dry forests and wilderness areas have significantly higher survivals than those over-wintering in young managed forests (Paulsen and Fisher 2001). Therefore, upland vegetation management under Alternatives 2-5 is more likely to improve overwinter fish survival than Alternative 1.

Fire and Fuels Effects on Aquatic Resources

The change from wildfire suppression across the plan area under Alternative 1 to AMR for resource benefits in Alternatives 2-5 is anticipated to generally reduce fire severity and limit the amount of watershed cover removed during uncharacteristic wildfires. Increases in uncontrollable high intensity fires under landscape-wide fire suppression under Alternative 1 are likely to result in 100 year peak flow increases ranging from 0 to 21%, depending on the watershed. By contrast, restoration of natural fire regimes through fuels treatments under Alternatives 2-5 would result in a maximum of only 6% increase in peak flows. Post fire recovery treatments such as Burned Area Emergency Rehabilitation (BAER) under all alternatives dampen the difference in effects between alternatives by hastening the recovery of watershed cover.

Aquatic Management Effects on Aquatic Resources

In general, Alternatives 2-5, through the Aquatic Conservation Strategy (ACS) provides more geographically specific management and active restoration than Alternative 1. The ACS includes the six key aquatic components of the ICBEMP Strategy for incorporating ICBEMP science into RMP revisions: riparian conservation areas, strong hold areas, multiscale analysis, restoration priorities, management direction, and monitoring. The ACS makes steelhead population strongholds a priority for restoration. This will provide high quality habitat for species, and support expansion and restoration of steelhead to adjacent watersheds. The ACS identifies Resource Management Areas (RMAs) and allows for adjustment to RMAs to reflect site conditions recognizing watershed wide riparian conditions and trends (Quigley and Arbelbide 1997, Megahan and Hornbeck 2000, Spence *et al.* 1996, USDA Forest Service 1997). The ACS uses multi-scale analysis to evaluate existing conditions, factors limiting aquatic species populations, resource risks, management needs, and restoration opportunities. Management direction, desired conditions, objectives, and management actions provided in the ACS will result in actions consistent with, and contributing to achieving those desired outcomes and conditions.

PACFISH (part of Alternative 1) does not propose any ground-disturbing actions or restoration, but sets in place certain riparian management goals and management direction with the intent of arresting degradation and initiating passive restoration of riparian and stream habitats. PACFISH set interim priority watersheds for restoration, but no further information was provided concerning the scope, type or timing of watershed restoration (NMFS 1995 a). In contrast, Alternatives 2-5 identifies restoration actions required to attain aquatic objectives. Full implementation of the restoration actions and other components of the ACS would result in attainment of a broader scope of aquatic objectives than Alternative 1.

Differences in current and projected stream channel conditions relative to proper functioning conditions (from the 1980s to the 2000s and projected to 2020) among Alternative 1 and Alternatives 2-5 are contrasted in Figure 4-3. Alternative 1 has resulted in largely fair ratings for stream channel conditions. Alternative 1 improved condition ratings on 20% of streams, while Alternative 2 is designed to improve condition ratings on 35% of the streams through active restoration. This assumes full implementation of restoration and BMPs under Alternatives 2-5 over the life of the plan. These assumptions are based on an increase in restoration, updated science, and geographic specificity under Alternatives 2-5 and on findings that suggest increasing large wood leads to increases in pool frequency approximately 50% over other passive treatments. The assumption is that certain stream channel types, particularly step-pool and high sediment yielding systems, will be more effectively restored by active rather than passive restoration. This assumption is based on monitoring and modeling of adjacent and similar landscapes (Wondzell 2007, Hilderbrand 1998, Montgomery 1995).

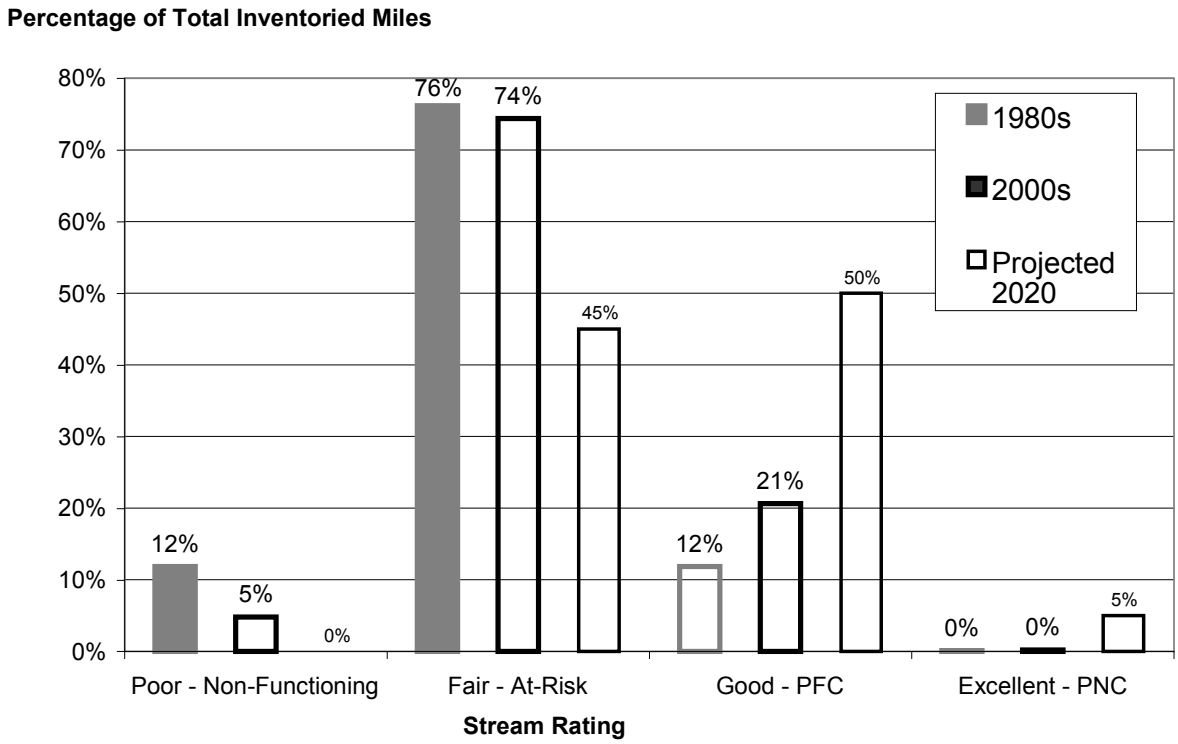
Riparian Desired Conditions

Proper Functioning Condition (PFC) is not included in Alternative 1 as a method to compare current to proper functioning ecological condition, except in the context of grazing under the PACFISH amendment. Alternatives 2-5 specifically incorporate national guidance on PFC into the RMP. Under Alternatives 2-5, the foundational objective for attaining PFC would be to provide the greatest diversity of vegetation and habitat for wildlife, fish, livestock and watershed protection (BLM Riparian-Wetland Initiative 1992). The use of PFC as a management objective is dependent on the following key items included in the aquatic strategy under Alternatives 2-5:

- The required number, type, and experience level of personnel conducting PFC assessments to ensure quality and validity of the assessment.

- PFC does not replace quantitative monitoring.
- Use of all aquatic objectives as the basis for making grazing or other management changes.
- Incorporation of other measures and tools for assessing the implementation, effectiveness, and validity of aquatic objectives, including biologic components.
- PFC is a short term plan objective which enables long term attainment of desired conditions.

Figure 4-3. Change in stream channel condition for streams inventoried in 1980 and 2000 and projected to 2020 for the action alternatives only.



Under Alternative 1 the objective for riparian vegetation management is to achieve mid- to late- seral conditions ("Excellent – PNC" in Figure 4- 3) along 60% of streams. Alternatives 2-5 aim to achieve this objective on 5% of streams. The action alternatives would provide more measurable and attainable objectives for the plan area than would Alternative 1. Although 95% of riparian areas would not develop to mid- to late-seral conditions under Alternatives 2-5, riparian areas would achieve an appropriate distribution of successional stages, and would be at PFC or on an upward trend, regardless of their seral stage. In Alternative 1, 40% of the plan area streams would not be managed toward potential. Managing a larger portion of the landscape toward PFC over the life of the plan and moving toward attainment of the 10 aquatic objectives will result in improved watershed condition across a larger portion of aquatic habitat. The 60% potential standard, under Alternative 1 would continue to be difficult to define, measure and realistically achieve. Alternatives 2-5 would better facilitate measurable and achievable restoration of aquatic conditions.

Riparian Management Objectives

Alternative 1 (PACFISH) contained set numbers for Riparian Management Objectives (RMOs) while Alternatives 2-5 serve to draw conclusions at the landscape scale. Alternative 1 does not specifically prohibit degradation of conditions in RMAs where management objectives are being attained. PACFISH does not provide specific direction to achieve RMOs (NMFS 1995 b). In contrast Alternatives 2-5 focus on the restoration of processes, such as sediment transport, or use types, such as locally important fish species. Alternatives 2-5 would allow aquatic conditions to progress to their full capability; whereas in Alternative 1 aquatic conditions might not improve beyond the RMO numeric standards.

Standards and Guides vs BMPs

PACFISH guidance under Alternative 1 applies to a specific set of management activities (timber, roads, grazing, minerals, fire and fuels management, lands and realty, riparian areas, watershed and habitat restoration, fish and wildlife). Specific guidelines for uses such as OHV, juniper removal, oil and gas or any subsequent new uses are absent in Alternative 1. However any action in RHCAs must move condition toward attainment of RMOs. Alternatives 2-5 use Interdisciplinary Teams (IDTs) and BMPs to address new uses. Alternative 1 does not include direction for modification or improvement BMPs and standards.

Under Alternative 1, the eight goals of PACFISH were stringently applied to watersheds with anadromous salmonids and the remainder of the area managed with a lower priority, but for the same intent. Under Alternatives 2-5, the aquatic objectives applied across the landscape together would increase the resiliency of aquatic ecosystems. Action alternative objectives for riparian function, habitat connectivity, locally important fish species, water use, and clean public drinking water may be attained on BLM land over the life of the plan. Other objectives are dependent on the actions of other land managers and/or require longer timeframes (over 100 years) to achieve objectives. Alternatives 2-5's ACS objectives, actions, guidelines and BMPs address requirements for all organisms identified through the BLM Learning Network (See Wildlife section) which utilize riparian habitat in the plan area.

Measurable Indicators of Progress (Measures of Attainment)

Alternative 1 is guided by PACFISH goals which lack measures to track attaining them. In contrast, Alternatives 2-5 are guided by aquatic objectives that have "measures of attainment" to track progress in achieving management objectives through the life of the plan. Alternatives 2-5 provide guidance for managing water quality limited streams to achieve beneficial uses and meet state water quality standards and to protect public drinking water supplies, whereas Alternative 1 does not. Alternative 1 emphasizes restricting uses to avoid impacts on anadromous fish and water quality. Alternatives 2-5 update the restriction on uses by applying BMPs with new science and uses multiple scale analysis to tailor the BMPs to this particular plan area. Alternatives 2-5 prescribe actions to be taken to restore RMAs within the plan area, while Alternative 1 focuses on modifying uses to avoid negatively affecting aquatic resources.

Water Quality and Beneficial Uses

Under Alternative 2-5's objective for water quality that provides for beneficial uses, the sum of the actions and BMPs will result in attainment of water quality standards where BLM is the major land owner. Where BLM is not the major land owner, BLM will not exceed the maximum daily load allocation, and may help facilitate attainment of this objective through cooperative efforts in the watershed. The amount of acres in uncharacteristic vegetation would be less in Alternatives 2-5 than Alternative 1. Under existing RMP direction (Alternative 1), 60% of steams are managed to "potential" and vegetation is not addressed on 303d listed streams. In Alternatives 2-5, 100% of streams have their vegetation managed to capability within natural disturbance regimes. Based on the biophysical settings (see Appendices E and F), 3,100 acres of uncharacteristic riparian vegetation may be restored to characteristic vegetation under these alternatives.

Under Alternatives 2-5, actions and BMPs for water quality and beneficial use will result in stream channels in or moving toward PFC and potential natural conditions (Figure 4- 3). Active and passive restoration of headcuts will restore vertical stability on 22 miles of stream channel.

Stream Channel Integrity

Linear features (e.g, roads and trails) can limit physical function of stream channels. Alternative 1 emphasizes road closures for roads contributing to non attainment of RMOs by prioritizing roads for closure, stabilization, or obliteration. Alternative 1 would protect stream channels from the construction of new roads which could affect stream function, but only about five miles of streams have had related roads decommissioned to restore stream function to date. Alternatives 2-5 identify criteria, a decision tree and actions to manage roads. Based on existing PFC information, 40 stream miles have limited physical function because of roads that limit the ability of stream channels to route sediment and convey stream flow. Alternatives 2-5 include closure, re-routing, decommissioning, obliteration, or rehabilitation of 56 miles of roads and better facilitates those 40 stream miles

moving toward PFC. Re-routing roads away from stream channels would reduce annual average sediment delivery by 50 tons. Assuming that PFC assessments are updated and expanded, more miles of stream may be restored by using the decision tree of the action alternatives on other sites.

Under Alternative 1, roads that may affect watersheds are improved to avoid affects to stream function. Five roads maintained by the BLM are affected. Under Alternatives 2-5, BMPs are expanded to include all linear feature construction and design in a more comprehensive manner. Implementation of these BMPs would further reduce the risk to streams from attaining PFC as a result of roads and trails. For example, ditches 50 feet before a stream crossing would reduce potential sediment delivery to streams by 50% (reduced from 430 to 206 average annual tons of sediment). Alternative 1 does not specifically address restoration of head cuts. Alternative 2-5's restoration of head cuts would restore vertical stability to 22 miles of stream.

Surface to Groundwater Interactions

Management under Alternative 1 focuses on restoration of in-channel habitat for anadromous fish but does not consider the risks and interdependencies of channel structures on channel function. Alternatives 2-5 emphasize less intrusive restoration techniques for restoring stream channel and floodplain connectivity. The techniques complement other ACS objectives and present lower risks to channel function than Alternative 1. The actions under the action alternatives are designed specifically for plan area streams and ecosystems. Alternatives 2-5 incorporate elements beyond the general guidance provided in PACFISH and existing RMPs. Therefore, Alternatives 2-5 would be more effective at restoration than Alternative 1.

Water Rights

Management under Alternative 1 provides guidance for water rights on the areas covered by the John Day Wild and Scenic River Plan and the Sutton Mountain CRMP. Alternatives 2-5 extend that same direction across the remainder of the plan area and provide more specific direction for the types of beneficial uses of water and water rights (see Table 4-10). The amount of water withdrawn from any individual source is protected from affecting instream flow goals by the table of water use stipulations included in Alternatives 2-5. Alternative 1 only contains flow stipulations for the Sutton Mountain and Wild and Scenic River Plan areas.

Table 4-10. Comparison of water right uses between alternatives.

Water Right Use	Alternative 1 Cubic Feet per Second (CFS)	Alternatives 2-5 Cubic Feet per Second (CFS)
Irrigation and Wildlife	5	0-10
Instream Leases	11.5	12-17
Mining	12	0
No Management	5.5	0
Ag Land Disposed	2	3

Lentic Areas

Management of lentic areas under Alternative 1 was not specified in current RMP direction and was fairly generic in PACFISH. Alternatives 2-5 provide more specific measures for achieving desired riparian condition. Alternatives 2-5 introduce reservoir safety and construction BMPs. These would reduce risks of dramatically increased peak flows and delivery of sediment to stream channels from failed reservoirs. Overall, the plan area has very few lentic areas, but springs and seeps are common. Management actions prescribed under the lentic objective of the action alternatives will better move wetland vegetation and aquatic conditions toward attainment of desired conditions than Alternative 1.

Native Riparian Plant Communities

Under Alternative 1, current RMP guidance and PACFISH management of riparian vegetation focuses on riparian habitat condition for anadromous fish species and general ecological diversity and productivity. Alternative 1 relies on passive restoration of channel conditions. Alternatives 2-5 emphasize the use of native riparian plant species unless ACS objectives cannot be attained without the use of non-native species. The actions identified in Alternatives 2-5 would move stream channels toward potential natural vegetation by incorporating natural disturbance regimes and implementing active restoration. The appropriate composition of vegetation will be restored to approximately 70 miles of stream currently lacking potential natural vegetation. Alternatives 2-5 require woody riparian species to achieve un-arrested and/or released growth forms (see glossary) and restore their potential stature. This will move almost 100 miles of stream which currently lack sufficient age class distribution towards attainment of PFC.

Vegetation for Physical Stream Function

Restoration actions for large wood are not prescribed in Alternative 1. Alternatives 2-5 prescribe use of invading conifers and other sources of large wood to restore pool habitat. This would shift attainment of pool desired conditions for restoration work from approximately 75 to 90%.

Under PACFISH, Alternative 1 contains PFC as a standard for grazing uses, but does not apply the standard to other uses in the landscape. Alternative 1 also does not include provisions for physical function ratings. Alternatives 2-5 prescribe changes in management to ensure the condition of riparian vegetation would dissipate energy and build stream channel habitat. Alternatives 2-5 include specific restoration actions, such as restoring alder and cottonwood to restore physical function of riparian vegetation. Alternative 1, under PACFISH, was not designed to, and does not include this specificity. Alternatives 2-5 would result in 50% of the plan area streams attaining PFC and providing physical stream function. Complete attainment of objectives over the life of the plan may not occur under any alternative due to the time and disturbances required to grow the large plants to meet this objective.

Fish Habitat

Alternatives 2-5 contain actions for restoring watershed cover for fish habitat, while Alternative 1 does not. Restoration actions should improve timing, intensity, and duration of peak flows and improve late season flows to attain instream flow objectives. Alternatives 2-5 also contain numeric criteria for spawning habitat that was not included in Alternative 1. Criteria for spawning habitat improvement will ensure attainment of healthy fish habitat and will provide a measure for stream channel sediment delivery.

Riparian-dependent Biotic Communities

Alternative 1 minimizes impacts to riparian areas and water quality. Alternatives 2-5 add a proactive aquatic and riparian restoration component. Alternatives 2-5 include provisions for addition of wood to streams contributing to a 50% increase in pool habitat where large wood is lacking. Alternatives 2-5 restore stream channel crossings, in combination with the crossings of other land owners, such that 90% of stream routes in each 5th field watershed have crossings that accommodate the 100 year floods, and route sediment and large wood in accordance with the natural geometry, slope, and bed stability of the channel. Achieving these objectives is dependent on other land owners, with BLM contributing to restored conditions on approximately 10% of streams. Passage requirements under Alternative 1 are proposed solely for passage of anadromous fish. Alternatives 2-5 use natural stream bed stimulation which would provide passage for all aquatic species.

Safe Drinking Water

Alternative 1 does not include management direction for protection of domestic water sources. Alternatives 2-5 afford protection to 6,700 acres of public Source Water Protection Areas and 200 acres of other domestic water sites on BLM.

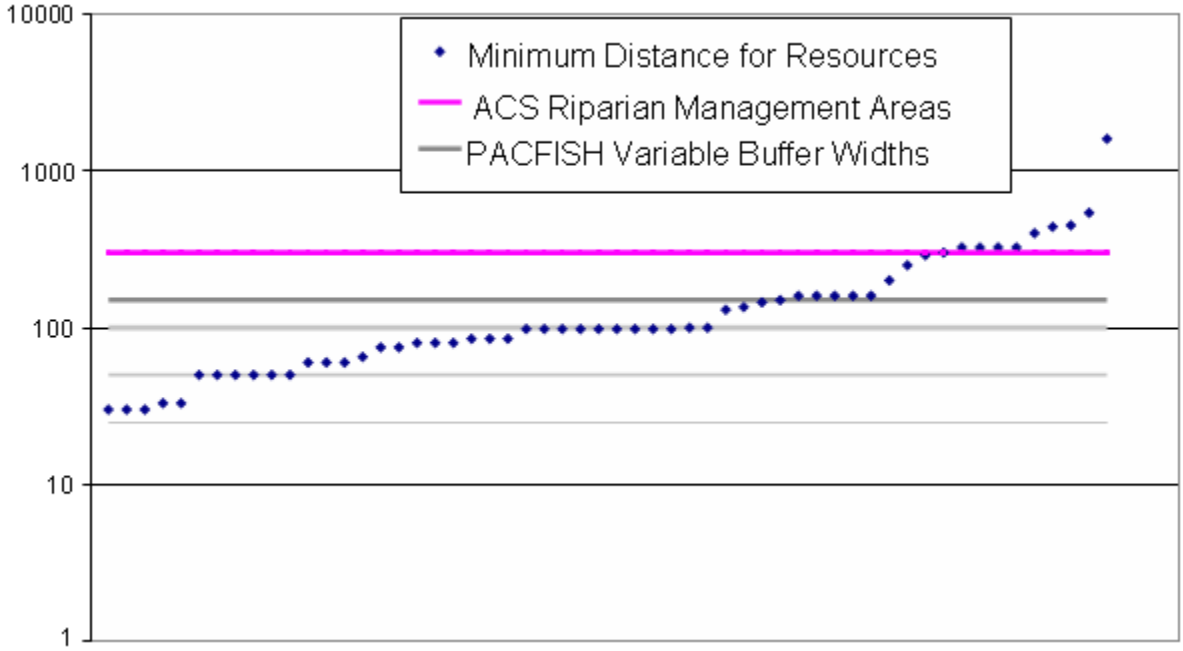
Riparian Management

Riparian Management Areas include a larger area and more affected resources under Alternatives 2-5 than Alternative 1. Alternative 1 (both existing RMPs and PACFISH) manage for the primary use of anadromous fish and meeting Clean Water Act requirements. Alternately, Alternatives 2-5 address fish and water quality, but also promote safe drinking water, judicious use of water rights, protection of physical function for all riparian dependent species, and floodplain restoration. Under Alternative 1, areas reserved for riparian management vary from 25 to 300 feet on either side of stream channels and lentic areas. The extent of the riparian management areas under Alternative 1 would range from 25 to 300 feet slope distance or the 100 year floodplain, whichever is greater. There is considerable variation in the literature regarding the width of riparian area necessary to maintain water quality and aquatic habitat condition (FEMAT 1993). A study of riparian management area widths reveals that resource requirements of channel complexity, nutrient, sediment and temperature buffering, general ecosystem function, anadromous fish, mammal, bird, reptile amphibian and bird habitat vary across the landscape (Santa Clara County 2000). Variable widths of Alternative 1 afford variable resource protection. Based on a set of 57 studies, Alternative 1 affords resource protection that decreases from 80 to 0% as widths decrease. Conversely, the majority of objectives for riparian areas in the action alternatives are met within the ACS width of 300 feet (plus the width of the 100 year floodplain) of perennial and intermittent stream channels (Figure 4-4) (County of Santa Clara Planning Office, 2003). Widths of the floodprone area plus 300 feet under Alternatives 2-5 would be sufficient to address factors of soil stability, water quality, microclimate, litter fall, root strength, shade, and large wood (pers. comm. Scott Hoefer NMFS 2008). All alternatives have sufficient RMAs to protect salmonid habitat in forested watersheds (Pollock and Kennard 1998).

The alternatives differ in the criteria used to delineate RHCAs (or RMAs). Alternative 1 RHCA widths vary depending on the presence of fish and whether flow is intermittent or perennial. Alternative 1 protects key watersheds, which are those with salmonids habitat, and has smaller widths along intermittent streams than perennial streams compared to the action alternatives. As a result, Alternative 1 management actions along intermittent streams could affect stream temperature and recruitment of large wood, increase sediment generation and reduce sedimentation of stream (NMFS 1995 a). In contrast, Alternatives 2-5 extend the protection to all watersheds in the plan area, regardless of the presence or absence of fish. Alternatives 2-5 do not differentiate between streams of varying flow regimes or fish presence when delineating RMAs and provides sufficient protection for all flow regimes and fish (NMFS 2008). RMA widths address multiple resource concerns and protect multiple species (Appendix Q and Figure 4-4).

Alternative 1 does not include a clear decision framework for mitigating effects originating outside RHCAs. Alternatives 2-5 set 20 acres as a trigger for using riparian management objectives as criteria for evaluating effects originating outside RMAs.

Figure 4-4. Riparian widths compared to results of 57 studies on minimum widths (distance) required to meet resource requirements of channel complexity, nutrient/ sediment/temperature buffering, general ecosystem function, anadromous fish, mammal, bird, reptile, amphibian and bird habitat (feet from stream channel).

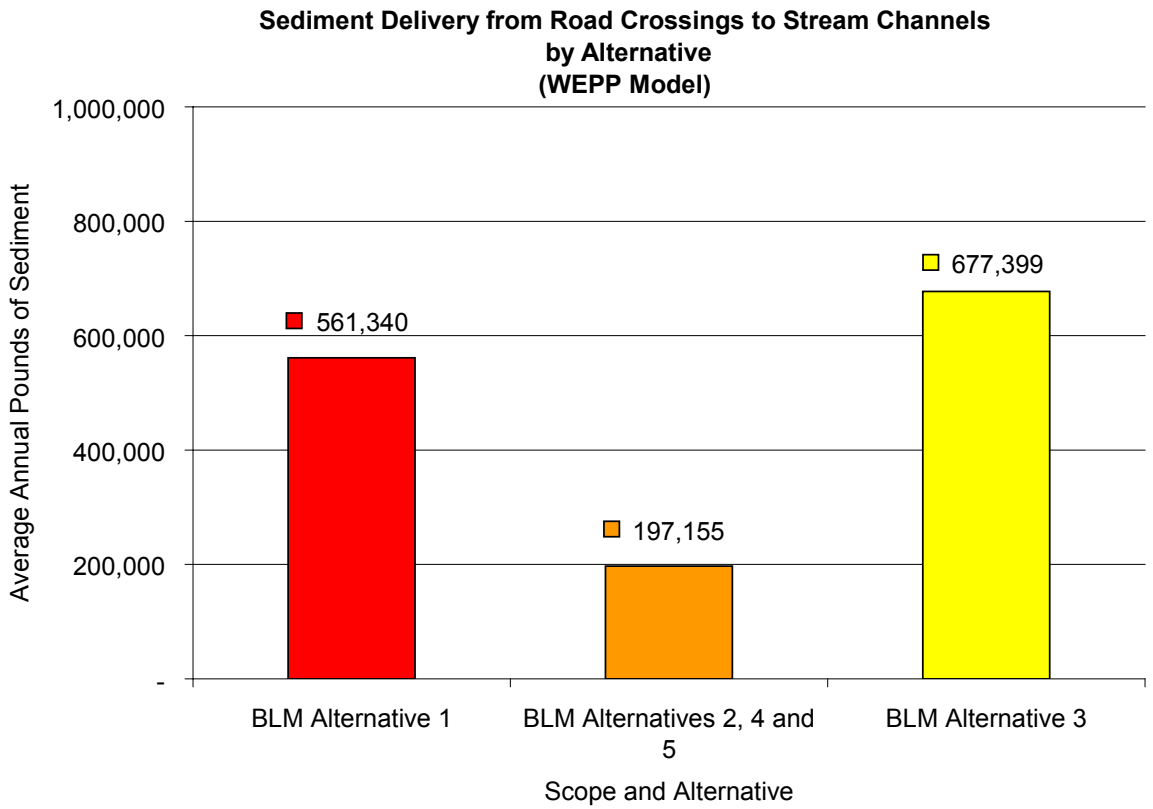


Alternative 1 limits management within RHCAs while Alternatives 2-5 emphasize attainment of aquatic objectives and restoration. This shift in management focus is enabled by the use of existing subbasin assessments under Alternatives 2-5. Vegetation treatments, roads, and trails within the 300 foot RMAs are proposed throughout the life of the plan. The use of ID teams and BMPs will allow these uses to attain resource objectives.

Transportation and OHV Effects on Aquatic Resources

The plan area contains streams currently listed as water quality limited under the Clean Water Act 303(d) due to sediment. The action alternatives would contribute to the restoration of water quality in these streams. For comparing alternatives, sediment from roads and trails within 100 feet of a stream crossing is assumed to reach the stream channel. Although BMPs are assumed to reduce sediment delivery to stream channels, stream crossings increase the risk of effects on aquatic species. The differences in sediment delivery from stream crossings between alternatives are compared in Figure 4-5. Compared to Alternative 1, Alternatives 2, 4 and 5 reduce sediment delivery to streams as a function of road closures. Alternative 3 would result in increased sediment delivery to streams because it would open many stream crossings that are closed under Alternatives 1, 2, 4, and 5.

Figure 4-5. Sediment delivery from road crossings to stream channels by alternative.



Open OHV designations in riparian areas allow indiscriminate crushing of riparian vegetation, churns up stream channel habitat, initiates erosion, and removes ground cover. These effects reduce physical stream function and contribute to non-attainment of PFC. Under Alternative 1, 30% of RMAs have Open OHV designations. Under the Action Alternatives, less than 1% have Open OHV designations (See Table 4-11). The action alternatives would result in more RMAs moving to PFC than Alternative 1.

Under Limited OHV designations, designated trails are likely to cross through RMAs. Similar to road crossings at streams, OHV crossings can cause sediment delivery to stream channels. However, very few new stream crossings are anticipated, and the use of BMPs and guidance under aquatic objectives will avoid degradation of physical stream function. Under Alternative 1, 30% of RMAs have Limited OHV designations. Under the action alternatives, large portions of previously Open areas are converted to Limited OHV designations. The designated trail and stream crossings in the action alternatives would result in more RMAs at PFC or potential than Alternative 1.

The Closed OHV designation ensures no sediment delivery or disturbance of aquatic habitat would occur. The action alternatives include 5% more Closed areas than Alternative 1 and would reduce the risk of sediment delivery to stream channels and disturbance of aquatic habitat.

Under Alternatives 1-3, there is an Open Designation on Rudio Mountain. This designation may reduce watershed cover, but the Open areas are small, primarily flat, and some already lack watershed cover. Therefore, it is unlikely that continuing the Open OHV use designation in these areas would translate into measurable differences of peak flows or sediment delivery to stream channels between alternatives. Under the action alternatives, triggers would ensure that the Open OHV designation does not violate water quality standards and ESA guidance.

Little Canyon Mountain is allocated for OHV use in all alternatives. Anticipated erosion and sediment delivery from OHV use would be isolated, and incremental increases in erosion would be drowned out by the erosion from areas already dramatically disturbed by historic mining and vehicle use. For Little Canyon Mountain and Rudio Mountain, sediment delivery would not be measurably different between the Alternatives.

Prior to cleanup and active management of the Little Canyon Mountain area a few years ago, the area was used as a dump sites for vehicles, refrigerators, appliances, and other rubbish. All alternatives propose continuing active management and the OHV use (mostly from the surrounding communities). Cleanup and active management of the Little Canyon Mountain area would reduce the risk of toxic materials from rubbish being dumped at the site and leaching into groundwater.

Under Alternatives 2-5, OHV use twould not retard the attainment of Aquatic Objectives over the life of the plan. New proposed OHV uses, such as specific trails, would be designed to meet aquatic objectives. If necessary, site specific use of BMPs and guidelines for OHV use would address site specific risks to water quality and fish habitat such as excess sediment delivery to the stream channel and water temperature increases from changes in shade and channel geometry.

Due to the combination of OHV closures proposed by the Forest Service in adjacent lands in the plan area, closures on private lands, and BLM closures in the action alternatives, cross country OHV users may concentrate their use in Little Canyon Mountain and similar areas. Providing areas for concentrated use (2 acres) may improve compliance with OHV closures and designated trail systems across the entire plan area. This would maintain or improve watershed condition across the rest of the public lands in the plan area (2.2 million acres).

Table 4-11. Acres of OHV Designations within Riparian Management Areas by Alternative.

OHV Designation	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Open	67,187	599	851	2	-
Limited	38,667	99,589	99,337	98,434	100,189
Closed	19,025	24,690	24,690	26,443	24,690

Wildlife Management Effects on Aquatic Resources

Alternative 1 does not include road density standards for the plan area. The lack of road density standards may increase road and stream crossings. These increased crossings increase the risk of excess sediment delivery to stream channels.

Under the action alternatives, road densities are prescribed to protect wildlife values. The prescribed road densities of less than 2 miles per square mile are slightly less than some of the existing road densities. By potentially decreasing the number of road crossings, the prescribed road densities would decrease the risk of sediment delivery to the stream channel (see Figure 4-5).

Construction of wildlife habitat features, such as water developments occur under all alternatives and may temporarily disturb riparian areas and springs. Alterations of vegetation for wildlife habitat, such as mowing, burning, tree cutting, and planting may alter the proportion of watersheds with forest cover. These alterations would be within the prescriptions provided in the Vegetation section. These effects are displayed by alternative under “Vegetation Treatment Effects on Aquatic Resources.”

Wilderness and Wilderness Characteristics Effects on Aquatic Resources

Modeling of land uses shows that fish over-wintering in areas managed as older dry forests and wilderness areas have significantly higher survival rates than those over-wintering in young, dry forest stands (Paulsen and Fisher 2001). Alternative 1 would manage 95,755 acres in WSAs and no areas managed for Wilderness Characteristics, versus 95,755 acres of WSAs plus 11,929 acres managed for Wilderness Characteristics for the action alternatives. Hence, the action alternatives would have greater likelihood of providing quality over-wintering fish habitat than Alternative 1.

Livestock Grazing Management Effects on Aquatic Resources

The alternatives would not differ in their grazing management effects on aquatic resources because the standards for protection of aquatic resources are the same across all alternatives. The grazing matrix tool under the action

alternatives (See Chapter 2, Livestock Grazing) was designed to reduce conflicts and BLM's expense from conflicts associated with public interests and BLM multiple-use resource management objectives. Funds saved or expended on management to achieve livestock grazing objectives are not subject to analysis of, nor are they anticipated to cause, differing effects on aquatic resources between alternatives.

Recreation Management Effects on Aquatic Resources

Outside the OHV designations, recreation management is not anticipated to significantly affect aquatic resources. Alternatives 2-5 propose up to three new recreation sites for a total increase of 34 acres within RMAs compared to Alternative 1. The use of BMPs is expected to minimize sediment delivery from the disturbances associated with high recreation use along stream channels and floodplains. However, the development of these recreation sites is assumed to help reduce pressure from dispersed, unmanaged recreation that could potentially impact these resources. Alternatives 2-5 may present opportunities to reduce soil disturbance on stream crossings from roads and reduce sediment delivery to stream channels, particularly in the North Fork John Day Subbasin.

Minerals Development Effects on Aquatic Resources

Protection of aquatic resources from minerals development would generally be greater in the action alternatives than in Alternative 1. Alternative 1 allows mining activity in RMAs as long as reclamation bonds and plans are prepared. Some mines with harmful effects to aquatic resources may proceed under Alternative 1 through to consultation for ESA compliance (NMFS 1995 a). Under Alternatives 2-5, all streams, except Dixie, Standard, and Canyon creeks would be identified as avoidance areas for mineral entry and are protected from any effects from new mineral uses (Table 2-17). Existing and new sites with mineral operations are required to meet ACS objectives through stipulations identified by an IDT. These sideboards eliminate impacts to aquatic resources under Alternatives 2-5. The limited recreational gold mining anticipated on Dixie, Standard, and Canyon creeks has sufficient side boards in place to avoid effects to aquatic resources. Additionally, there would be limitations of size, scope, and type of equipment to protect aquatic resources. In any case, the gold production potential of these sites is limited.

Effects of Current and Reasonably Foreseeable Future Management

Future management on private, Forest Service, State, and other land within the plan area are assumed to be similar to current management. The Forest Service Schedule of Proposed Actions (SOPA) is indicative of the types of management actions which are likely to continue into the future through out the plan area (see cumulative effects section for vegetation).

Other Effects

Vegetation, Fuel and Fire Management

Plan area land managers generally share the objective of reducing ladder fuels to help reduce the potential for crown fires. This includes thinning and using prescribed fire to reduce potential for stand replacing fires. Forest managers will conduct small tree thinning, under burning, hand piling and lopping of slash to reduce fuels, removal of hazard trees, and recover the value of dead and dying timber damaged by wildfires. Thinning of overstocked stands of ponderosa pine and Douglas-fir is proposed to improve stand health and vigor. Many thinnings will be done from the understory, with the largest and most vigorous trees left after thinning. Commercial thinning of dry site forest and woodlands will be conducted to reduce tree competition and improve stand health and vigor. These project areas are likely to include non-commercial thinning of young conifer stands to reduce tree density in the understory. Removal of post and pole size lodge pole through personal use post and pole removal are likely to occur on several hundred acres in the plan area.

The amount of forest health treatments on non-BLM lands is largely dependent on global fluctuations of social, economic and environmental demands. Forest health treatments would be required on private lands in order to completely attain desired conditions for pools. While state forestry practices are designed to provide large wood and aquatic habitat, research has shown that these rules will only attain about 50% of the potential large wood recruitment or about 25% of desired pool frequency conditions (Cordova 1995). Increases in the use of categorical exclusions for vegetation treatment may increase the acres of federal lands treated.

Land managers across the plan area will continue site-specific treatment of invasive plant species on thousands of invasive plant sites. Treatment methods include herbicides and manual, mechanical and cultural treatments. The National Programmatic EIS for Vegetation Management addresses the cumulative effects of these sorts of activities.

Agencies with wildfire response responsibilities will continue fire suppression by aerial application of fire retardant to fight fires in the plan area. Water quality effects of fire retardant will be isolated and minimized by the requirement for compliance with the Clean Water, Endangered Species and Safe Drinking Water Acts and wildfire retardant avoidance areas.

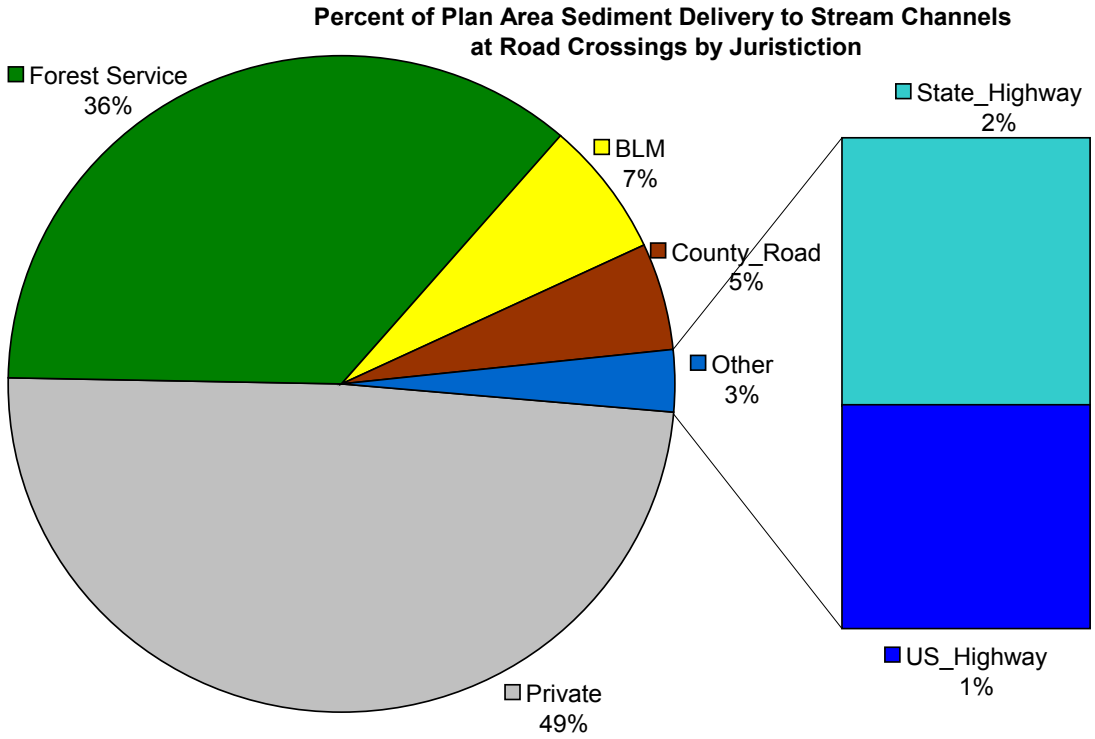
Vegetation management by other jurisdictions across the plan area is generally consistent with BLM resource management objectives and is restricted to assure compliance with the Clean Water act and Endangered Species Acts, requirements for fish habitat, and other aquatic protections. The cumulative effect of vegetative treatments on peak flows across the plan area is displayed in Figure 4-6. Vegetation treatments across all ownerships in all watersheds in Alternatives 2-5 would reduce the risk and magnitude of stand replacing fires. Consequently, peak flow increases under Alternatives 2-5 are expected to be less than Alternative 1.

Early spring or fall prescribed burning of native open forest and grasslands by other public and private land managers in the plan area will increase vegetation growth and vigor, rejuvenate brush and increase brush sprouting, stimulate grass production, open some closed canopy, and reduce ladder and ground fuels, all with beneficial effects on aquatic resources.

Transportation

Roads in the plan area are managed by state, federal and county agencies. The current average annual sediment delivery to streams across the entire the plan area is estimated at 230 tons (see aquatic indicators section for discussion of methods). The BLM's transportation network of interim routes under Alternatives 2, 4 and 5 would reduce the sediment delivery to streams across the plan area by 4 percent; reducing BLM's proportional effect from 7 to 3 percent of the total sediment delivery from roads (Figure 4-6).

Figure 4-6. Percent of plan area sediment delivery to stream channels at road crossings by jurisdiction.



All Federal land managers will implement road management plans (including road construction and decommissioning). County and state road managers are likely to continue to work towards decreasing erosion from roads and implementing BMPs to reduce the risk of sediment delivery to streams. The combination of the activities is expected to decrease total plan area sediment delivery to stream channels throughout the life of the plan.

Riparian Management

Riparian management across land ownerships in the John Day River basin will continue to use off-channel water development to redirect grazing away from riparian areas. Restoration activities will continue to redistribute dredge tailings and restore floodplain connectivity along rivers and streams in headwater areas. Stream and meadow restoration projects will use rock and plant materials to build in-channel structures. Emphasis will shift to use of vegetative riprap in slackwater areas. Land managers will continue to plant and fence woody riparian species. These actions complement BLM aquatic objectives under the action alternatives. Land managers will remove conifers from aspen stands and may exclude these areas from grazing. These actions are intended to release individual aspen trees and rejuvenate the stands.

Water Management

Federal land managers will continue to issue rights of way and easements for the operations and maintenance of irrigation and domestic waters facilities crossing or originating on federal land. New science and conservation efforts may be incorporated into the terms and conditions for these water facilities

Future projects will install tanks to collect rainfall and snowmelt to improve or create upland bird habitat. Barbed wire fence will be installed to exclude livestock. Other projects will install perforated pipe collection and similar systems at spring sources, and divert water to livestock watering troughs. The Forest Service will continue to issue special use permits for spring boxes and waterlines associated with domestic water use on Forest Service land. These uses are small in magnitude and do not measurably affect instream flows or water availability, except where they improve floodplain function for capturing spring runoff and late season release.

Federal land managers will continue to permit native (mostly) hay cultivation and grazing on small strips of floodplains. These areas are usually associated with adjacent private agricultural land management. The cumulative effect of BLM water use is negligible in the face of the other water users in the basin.

Lands and Realty

Landowners continue to seek opportunities to consolidate ownership of Federal, state and private lands. Assuming that national trends in the migratory patterns of retirees to the Inland Northwest continue, private lands are likely to become sub-divided into smaller parcels for retirement homes and recreation uses. Road-stream crossings and watershed cover changes are likely to increase with increased population and recreation uses.

The Forest Service will continue to issue special use permits for rights of way of primary power lines with 40 foot poles across the plan area. Other utility corridor permits maybe be for buried utility corridors. Communication corridors and sites such as fiber optic cable and cell towers are likely to increase with increasing demand.

Livestock Grazing

The Forest Service will continue to authorize and permit livestock grazing on most of their allotments. Re-authorizations will likely continue according to current grazing management. Grazing management will be modified in authorizations if existing grazing management does not demonstrate maintenance of desired conditions or movement toward desired future condition described in Forest Land and Resource Management Plans. A few Forest Service allotments may be removed from permanent allotment status. Fencing is likely to continue within and around Forest Service allotments. Fish habitat and water quality concerns may lead to development of off channel livestock watering sites and water gaps. Because of requirements of federal land management planning criteria associated with aquatic resources, all of these activities will combine with BLM management to improve water quality and ecological condition of aquatic resources.

Mining

The Forest Service will analyze existing and proposed mining plans of operations for active mining operations, such as those within the Lower Granite Creek Watershed. Land managers will continue to close abandoned mines by filling in adits (see glossary), trenches, and shafts with earth and rock from existing mine spoil piles and recontouring slopes adjacent to work area. While these actions are likely to move the landscape toward attainment of water quality standards, the rate of recovery cannot be measured because it is dependent on funding.

Planning

The Forest Service will use the same Aquatic Framework from ICBEMP to update their forest plans as the BLM used to develop the aquatic conservation strategy in Alternatives 2-5. This will afford an opportunity for addressing issues similar to those addressed in this BLM plan. Forest Service plans add flexibility and resource protection. Forest Service plans may establish special management areas or zones with specific resource or use emphasis. For example, current Forest Service plans established Research Natural Areas, such as the Shake Table plateau between Murderer's Creek and South Fork Murderer's Creek. Aquatic restoration planning and implementation by the Forest Service and other Designated Management Agencies (DMAs) are likely to result in at least minor improvements of all the indicators of aquatic condition and protect the source water and domestic water supplies. Designated Management Agencies are responsible for implementing actions to attain their portions of TMDLs. Ninety-eight percent of domestic water use in the plan area is on private lands, one percent is on BLM and one percent is on Forest Service land, so the relative impact of BLM domestic water management is very small. However, the BLM has a larger proportion of plan area Source Water Protection Areas on BLM administered lands (14%).

Recreation

Forest Service campground boundaries will continue to be adjusted to relocate sites away from streams and lentic areas, accommodate increased recreation use and achieve other resource objectives. Recreational camp sites will likely increase and will include attributes such as handicap accessible tables, fire rings, concrete vault toilets, gravel parking spurs and access roads, bulletin boards, signs, shelters for winter and summer use and possible placements of boulders around campground perimeters. Land managers may remove and replace toilets in or adjacent to existing footprints. Some projects will relocate parking areas, construct new sections of trail, and adjust interpretive signing. In addition, fences will be constructed to minimize conflict between recreation and other uses. Increased recreation may affect attainment of some aquatic objectives relating to sediment and riparian vegetation. However, management agencies have a suite of BMPs available to mitigate or remove these effects on a case by case basis.

General

Overall, all alternatives maintain traditional land uses in the area. The alternatives are not likely to increase urbanization or other land uses which dramatically impact aquatic resource by increasing peak flows, amount of household toxics, stream crossings, fill of floodplains for development and other effects.

The cumulative effects of current and reasonably foreseeable actions are not likely to exceed thresholds for acceptable water quality standards, fish habitat conditions, beneficial water uses or aquatic species habitat conditions as measured by the aquatic objectives. In general, requirements of the federal land management planning criteria associated with aquatic resources (Appendix A) will guide a third of the plan area managed by federal agencies toward improved water quality and condition of aquatic resources. This will compliment the effects of BLM actions in the plan area.

Wildlife

Priority Species and Communities were used in this analysis and identified through the Conservation Action Planning process developed as part of the BLM Conservation Learning Network. The BLM Conservation Learning Network is a pilot project sponsored by the BLM WO to assist BLM RMP teams in achieving BLM Land Use Planning goals and objectives (BLM H-1601-1) for priority habitats and species. The JDB RMP Team was one of four teams from the BLM that participated in this pilot.

The BLM Conservation Learning Network was developed under a National Fish and Wildlife Foundation grant sponsored by the BLM Washington Office. Planning tools and processes were developed via cooperative effort among the BLM, The Nature Conservancy, the Idaho Department of Fish and Game, and the Colorado Natural Heritage Program. The project evolved from a five year Assistance Agreement between the BLM and The Nature Conservancy to develop planning tools for RMP use.

Priority Species or Communities were identified to address the habitat needs of all species on the Interagency Special Status/Sensitive Species Program list (ISSSSP - July 2007), Partners in Flight focal species, and locally important species known or suspected to occur within the plan area (Appendix O). The Priority Species and Community concept is a stepped down assessment method of the source habitat concept utilized in the Interior Columbia Basin Ecosystem Management Project (ICBEMP), which was a large scale assessment that encompassed the entire Interior Columbia Basin, including the plan area.

The assessment of Priority Communities enables us to display effects to groups of species rather than individual species. Priority Communities are based on groupings of biophysical settings (BPSs) and include forestland, rangeland, shrubland, juniper steppe, grassland, riparian, and cliffs, canyons and caves. Appendix F displays the BPS composition of each of the Priority Communities, except for cliffs, canyons and caves. For a more detailed description of BPSs, see Appendix E. Appendices O and Q provide a summary of habitats, priority species, and how the draft RMP addresses their needs.

Analysis of the environmental consequences of the alternatives on wildlife considered the following key resources or resource uses: Vegetation, Fire and Fuels, Aquatic Resources, Wildlife, Caves, Livestock Grazing, Recreation, Access and Transportation, Scenic Byways, Energy and Minerals, Lands and Realty, and Agricultural Lands.

Proposed management of the following resources/programs have no new actions proposed or would have no anticipated impacts at this scale to wildlife: Soils, Air Quality, Wild Horses, Native American uses, Paleontology, Cultural Resources, Special Status Plants, Noxious Weed Control, and Hazardous Materials.

Wildlife Indicators

The following indicators were used to compare and assess effects:

- **Quantity, quality, and spatial distribution of wildlife habitat are indicators of effects to species (see Appendix O).** The primary indicator of quantity for general habitat types is the Acceptable Range of Variation (ARV) for vegetation. BpS descriptions include structure, canopy cover, and patch size information. Each of these features as well as the juxtaposition of foraging, reproductive, and security habitat determine the quality of habitat. Some wildlife habitat quality is also dependant on special features like snags and large down wood.
- **Forage availability, composition, quantity and quality** indicate how habitat effects the vigor of individual wildlife species.
- **Composition, quantity and quality of vegetation** surrounding caves are an indicator of the quality of wildlife habitat provided by a cave.
- **Off road use by motorized vehicles** is an indicator of disturbance to wildlife lifecycles, wildlife migration, and decreases in habitat quality. Higher open road densities increase the potential for disturbance of foraging and reproductive activities, habitat destruction, and human induced mortality. Limiting OHV use to designated roads allows wildlife to adjust to human activities, limits the scope of impacts, and decreases the potential for habitat destruction.

- **Timing of disturbance** is an indicator of the effects to wildlife lifecycle requirements and vigor. Disturbance during critical seasons, such as the mating season, may reduce breeding or otherwise alter wildlife vigor.
- **Prescribed and interim road density** is an indicator of habitat quality, quantity, and spatial distribution. As road density increases, habitat quality, quantity and spatial distribution decrease.
- **Habitat security areas** are areas where the level of human disturbance is limited and wildlife sensitive to human disturbance can carry out all or part of their lifecycle requirements.
- **Acres of developed recreation** is an indicator of loss to wildlife habitat quality and quantity. It is also an indicator of how wildlife is spatially distributed across the landscape.
- **Acres with potential for land exchange or sale** indicates potential to alter vegetation and thus wildlife habitat patterns with the correlating change in management emphasis. Land acquisitions or disposals can affect the amount, quality and effectiveness (connectivity) of wildlife habitat and the ability to manage for wildlife resources. Land exchanges that block-up habitat allow for management of larger patch sizes, increase the ability to utilize prescribed fire, and reduce operating costs.
- 1 **Security habitat and fragmentation.**
- **Acres available for wildlife food and cover** indicates the amount of food and cover available for upland game species, specifically birds. Irrigated lands in food and cover crops increase the amount and diversity of wildlife utilizing these and surrounding acres.

Wildlife Assumptions

- 1 Special Management Area designations may include restrictions that would result in less vegetation manipulation designed to benefit wildlife habitat. Maintaining Wilderness Characteristics, Wild and Scenic Rivers (WSR), Areas of Critical Environmental Concern (ACECs), Research Natural Areas (RNAs), and desired Visual Resource Management (VRM) classes may affect wildlife habitat by restricting the methods or tools available to achieve wildlife goals.
- 1 Wildlife habitat needs vary significantly by wildlife species. It is generally true; however, that healthy and sustainable wildlife populations can be supported where there is a diverse mix of plant communities to supply structure, forage, cover and other specific habitat requirements. The compliment of native wildlife species in the plan area adapted over time to be successful at reproducing within the historical vegetation mosaics. Managing to promote a diverse mix of plant communities is thus an important component of managing for a complement of species, as opposed to a single species concept of management.
- 1 In order to provide a realistic magnitude and context of effects on wildlife in the plan area, this analysis uses priority vegetation treatment areas to indicate effects of treatments.
- 1 Designating Byways reduces wildlife security due to increased disturbance from vehicle traffic.
- 1 Open OHV areas will increase in use due to closures in other areas.
- 1 On lands grazed by livestock and/or wild horses, big game would compete for available forage. In addition, livestock use can alter wildlife habitat structure.
- 1 Direct disturbance to a species and possibly its habitat can affect species' use of an area.
- 1 The ability to limit travel to interim roads is uncertain given the scattered and isolated nature of BLM lands.
- 1 The ratio of commercial agriculture to wildlife food and cover crops will average approximately 50/50 on BLM agricultural land.
- 1 Many basic wildlife population management issues do not differ between alternatives, including the following. The following issues will by addressed during plan implementation by following general wildlife guidelines.
  - 1Habitat requirements for any particular species cannot be met everywhere – species specific needs are often very site specific.
  - 1Habitat may be only seasonally available due to elevation, aspect, type of vegetation present and proximity of human disturbance.

- Habitat conditions will vary due to natural processes and wildlife uses of habitats can change, even if human-caused influences are reduced or eliminated.
- The interaction of an animal population with its habitat is dynamic, and numbers of animals and their geographic distribution may vary significantly over time. However, there is a critical minimum threshold at which degraded habitat conditions or reduced population size and viability limits the long-term sustainability of the population. There is a similar upper limit that limits further population growth or expansion.
- Thresholds on wildlife population growth and distribution may be biological, natural or human-caused, and are most important with small, sedentary populations and species with very rigid breeding habitat requirements, including cave bats, and amphibians.
- Learned and traditional behavior may limit a species' ability to colonize or re-colonize habitat, and adaptability varies by species.
- Management actions intending to benefit a specific habitat or a priority species will influence other species occurring in that same habitat. Therefore, impacts to wildlife populations and habitat are not discrete since actions may benefit one species while having an adverse, or a beneficial impact on another.

Effects of Vegetation Management on Wildlife

The following analyses of effects are organized by the following Priority Communities: grassland, shrubland, juniper steppe, forest, riparian, and cliffs, canyons and caves. Priority species by habitat are shown in Appendices O and Q.

Grassland Habitats

The Palouse Prairie (bunchgrass prairie) historically has been converted to farmland, and introduced nonnative annual grasses have altered fire intervals. Within the plan area, grassland habitats are currently deficient in mid to late seral stages and there is a surplus of uncharacteristic vegetation (see Appendix F). Areas of uncharacteristic vegetation include agriculture fields, and the nonnative annual grasses cheat grass and medusa head. Invasive annual grasses reduce native wildlife habitat suitability by altering forage and cover. Invasive annual grasses also perpetuate homogenous landscapes by enabling fire above historic frequencies. Disturbances such as cultivation and more frequent fire have resulted in short plant structure and a lack of cover for the Washington ground squirrel and ground-nesting birds such as the grasshopper sparrow. Some of the grassland priority species (Appendix O) are associated with late seral grasslands, where there is a minor shrub component. These shrubs provide browse for mule deer and antelope and would be important on winter ranges.

Under Alternative 1, grasslands on BLM lands would be managed for mid to late seral conditions. However, the existing management scheme has not yet served to rectify the deficit of mid to late-seral grasslands and the extent of uncharacteristic vegetation. In practice, the primary emphasis of vegetation management would likely continue to be towards early to mid seral conditions. Wildlife habitats are expected to continue the trend of decreasing quality under current management (Alternative 1).

Under Alternatives 2-5, less than 15% of the grasslands are within priority vegetation treatment areas (Map 4). Treatments would focus on increasing the quantity and quality of wildlife habitat for priority species. Under these alternatives, a portion of grassland habitats would be further prioritized for treatments where they occur on big game winter ranges. The action alternatives also include a seasonal timing restriction on disturbances and/or provide for buffer distances for species such as sage grouse, prairie falcons, antelope and big horn sheep, and would serve to reduce disturbance of these populations (Table 2-5). Consequently, vegetation management in general under the action alternatives would increase habitat quality for grassland wildlife species.

Under Alternatives 2 -5, grassland habitats would be managed to achieve an acceptable range of variation (ARV) in vegetation structure and composition based on the biophysical setting (see Appendix F) and move uncharacteristic vegetation back into native species, where possible. The result would be to eventually increase the quantity and quality of grassland habitats in priority vegetation treatment areas.

Short- and long-term effects of vegetation treatment types on grasslands.

Fire treatments in grassland communities cause a short term loss of nesting cover and loss of seed crop and in some cases reduction of insect populations for foraging. The majority of these effects last less than five years. In areas with healthy native herbaceous cover total grass cover and vigor is also improved for several years resulting in higher value hiding, nesting, and foraging habitat.

Grassland communities are fire adapted systems; however, fire can cause an increase in the dominance and spatial distribution of annual grass composition. Alternative 1 would continue suppression of all wildfires, and current prescribed fire treatment levels in rangelands (including grasslands) of approximately 2,000 acres per year (Table 4-4). Alternatives 2-5 would treat 2,000 rangeland acres per year with prescribed fire, and would additionally allow for 1,500 acres of fire management with appropriate management response (AMR). The action alternatives preclude AMR in areas of high annual grass composition. Over time the health and vigor of grassland communities would be less under Alternative 1 than Alternatives 2-5.

In the short-term, seeding would improve habitat quality and quantity by restoring native habitats used by priority grassland species. Restoration of native grass habitats would increase the year-round habitat and forage for all the priority species. Restoration seeding designed in a mosaic pattern would increase overall quality and quantity of big game habitat. An increase in the health and vigor of the shrub and herbaceous layer improves palatability for big game species. Alternatives 2-5 have more specific prescriptions for mosaics of native grass and shrub restoration and would increase habitat quality, quantity and spatial distribution more than the less prescriptive Alternative 1.

Over the long-term, moving the landscape toward a more viable and sustainable range in vegetative structure and composition would meet the habitat needs of priority grassland wildlife species. Habitat conditions provided under the action alternatives will provide a mosaic of habitat features such as large expanses of perennial native grasses interspersed with low density patches of shrubs. Existing stands of perennial bunchgrasses are expected to be retained and uncharacteristic classes and overabundance of early seral classes will be replaced. Management under Alternatives 2-5 will be focused on achieving ARV, which should have a greater positive effect on populations as a whole than alternative 1. Long term detrimental effects of Alternatives 2-5 to big game are not expected due to the anticipated size and design of treatment areas. Viable big game habitat is expected to occur across the landscape and retained over time under the action alternatives.

Shrubland Habitats

The combination of fire control and excessive grazing allow juniper expansion and reduce the quantity and vigor of understory species. These sites are often invaded by nonnative annual grasses or noxious weeds. Within the plan area, most of the shrubland habitats currently include a surplus of early seral stages, a deficit of mid and late seral stages and most include significant amounts of uncharacteristic vegetation, both on and off BLM lands (see Appendix F). These changes in habitat structure and composition have had a variety of effects; for example the quality of sage grouse brood-rearing habitat declines due to reduced understory species diversity. Perches for predators of sage grouse increase due to increases in juniper.

Under Alternative 1, there exists no direction for rangeland vegetation. Past vegetation management practices have resulted in excess early and late seral and uncharacteristic conditions. The lack of natural fire has resulted in expanding juniper populations and densities. Shrublands with juniper occupation provide increased wildlife species richness until the juniper dominance impacts the shrub and herbaceous component. Without treatment these stands lose their diversity of wildlife and become resistant to fire due to the reduction of understory plants. Continuing this trend under Alternative 1 may adversely impact ground nesting birds and shrub dependant species. The loss of understory also reduces forage value for small mammals and large herbivores.

Under Alternative 2-5, approximately 16% of BLM shrublands are within priority vegetation treatment areas (Map 4). These habitats are dominated by encroaching juniper or other uncharacteristic vegetation and treatments would focus on reducing juniper and increasing native bunchgrass. Under these alternatives, a portion of shrubland habitats would be treated to enhance big game winter range habitat quality and provide sage grouse habitat. The action alternatives also include a seasonal timing restriction on disturbances and/or buffer distances for sage grouse, ferruginous hawks, antelope and big horn sheep, which would serve to help minimize

disturbance to these populations (Table 2-5). Consequently, vegetation management in general under the action alternatives would increase habitat quality and quantity for shrubland wildlife species more than continuing the vague existing management under Alternative 1.

Short- and Long-term Effects of Vegetation Treatment Types on Shrubland Habitats

In all alternatives, anticipated short-term effects of fire treatments on shrubland priority species would generally reduce shrub cover since many of these species require shrubs for nesting, hiding cover and food. Generally, big game species would benefit from the increased forage and quality winter range that would result from fire treatments. If too much sagebrush is removed from a broad area, winter range habitat quality could decrease. Since the action alternatives (Alternatives 2-5) call for relatively greater amounts of rangeland fire treatments through appropriate management response than Alternative 1 (Table 4-4), they may also have more short-term displacement of, and habitat loss for individuals of select priority shrubland wildlife species.

Short-term effects from mechanical treatment of juniper is expected to benefit land bird species and pygmy rabbits by opening areas up for foraging and nesting habitat, while reducing perches for aerial predators. Mechanically treating shrub BpSs where juniper canopy cover exceeds 40% would improve the quality of the shrub and grass habitat components and increase the availability of nesting and foraging habitats for land bird species. An exception to this may be where the lark sparrow may require some use of taller tree canopies. The mechanical development of mosaics in growth forms increases lark sparrow habitat quality by providing edge effects within lark sparrow habitat. Reductions in habitat in Alternative 1 would not consider the amounts or types of treatments necessary to retain sufficient habitat for lark sparrow and other species that utilize juniper. The action alternatives will retain juniper in densities and locations in balance with other seral conditions in shrublands.

Mechanical treatments are expected to increase forage and decrease hiding cover in the short-term. Alternative 1 provides no direction for the pattern of mechanical treatments. Under Alternatives 2-5, mechanical treatments would be designed in a mosaic pattern to improve overall quality and quantity of big game habitat. A positive response in the health and vigor of the shrub and herbaceous layer is expected and will improve palatability for big game species. Detrimental effects to these species could become evident if treatments were conducted over too large of an area under any alternatives.

All alternatives propose restoration seeding. Alternatives 2-5 provide additional direction about the pattern of seeding and priorities for restoration treatments, whereas Alternative 1 doesn't. The criteria associated with restoration treatments in the action alternatives is expected to benefit big game winter ranges, sagebrush habitat patch size, and riparian habitats. Restoration efforts along drainages where well drained deep soils occur would increase the quantity of habitat for pygmy rabbits.

Over the long-term, moving the landscape toward a more viable and sustainable range of vegetative structures and composition would meet the needs of priority shrubland wildlife species. Habitat conditions that provide a mosaic of habitat features such as open patchy shrubs, large patches of sagebrush, dense canopy cover of sagebrush, and tall shrubs, would increase wildlife habitat quality and quantity.

Prescribed fire and wildfire reduce the amount of shrub habitat in the short term. If the fire return frequency or size of burns is too large the amount of shrub habitat available for 20 – 100+ years can be insufficient to support species that require > 10% shrub cover. The action alternatives would result in more fire in shrublands due to AMR. Management direction contained in the action alternatives regarding the conditions and locations where AMR would be allowed based on annual grass and noxious weed composition should limit the amount and extent of detrimental fire effects. Fire size, frequency, and intensity within ranges appropriate for the BpSs would maintain stands in early to mid seral condition where herbaceous growth is vigorous and provides cover and forage. Shrub stands without a healthy herbaceous component provide a far lower quality of foraging and reproductive habitat.

Through time and without further distrubance, areas currently in an early seral condition are expected to transition to mid seral without further disturbance. The action alternatives identify areas where mid seral shrub conditions are limited and direct treatment is toward mechanical rather than fire treatement type. Alternative 1 does not contain this direction.

Alternative 1 would manage portions of the planning area with a cover: forage ratio; however, this ratio is not specific to the vegetative potential of the site. Meeting this ratio in shrubland BpSs can result in a loss of large blocks of shrub dominated habitat necessary for species like sage-grouse, antelope, and sage-sparrow. The action alternatives would allow for larger treatments sizes in shrublands when required by existing conditions because patch size requirements are tied to the BpS descriptions. This can reduce the amount of hiding cover for some big game species and nesting habitat for species like horned lark, but would increase habitat for ground level nesting species and species that require large blocks of unfragmented sagebrush habitat. The overall amount of edge habitat may be less under Alternatives 2-5 than Alternative 1 due to patch size requirements. However, management under Alternatives 2-5 would still be focused on achieving ARV, which would direct patch size and seral structural conditions toward those specific to BpS site potential and thus provide habitat for species that require larger contiguous blocks as well as those that utilize edge. Managing to meet seral structural stages across diverse BpSs on the landscape would ensure variability of cover and forage conditions but not to the exclusion of one or the other.

Western Juniper Steppe Habitats

Western juniper steppe BpS habitats are typically associated with rocky rims or other harsh sites where a physical barrier precluded natural fire from burning on a frequent basis. Larger percentages of these sites were in late seral conditions orold growth (see glossary) in the past. Old growth trees and stands provide hollow trees for primary and secondary cavity nesters, crevasses for small mammal dens, berries that provide a food source, perch sites for raptors, and many other unique wildlife habitats.

Many of these sites have seen an increase of post-settlement juniper in the understories. This increase in juniper cover alters understory conditions. The increase in understory juniper puts the stands at greater risk of burning until understory trees become of a size where they no longer provide ladder fuels to the larger structure trees. Over time these stands again become resistant to fire due to the increased competition stress. Increased competition stress and higher potential for fire put these stands at a greater risk of stand replacement. Old growth conditions in juniper would take hundreds of years to return.

All alternatives would direct management to retain late seral conditions on the majority of these habitat types. The action alternatives provide more specific direction in that they identify BpS locations where this management should occur as opposed to Alternative 1 which is not location specific. Alternative 1 does not provide direction for prioritizing treatments to achieve ARV of juniper steppe habitats. Under Alternative 2-5, juniper steppe has 33% of its area within priority vegetation treatment areas (Map 4). Because the action alternatives are more site specific relative to old growth retention locations, these conditions would be more sustainable through time. The action alternatives also provide specific direction for the retention of old growth trees and stands whereas Alternative 1 does not.

Due to the prioritization of treatments in Alternatives 2-5, it is expected that old growth conditions in juniper steppe would be better protected in the action alternatives than Alternative 1.

Forested Habitat

As a result of current and past management, dry forests (ponderosa pine, mixed conifer and drier Douglas-fir) generally have denser understories, fewer large trees and more shade tolerant species than what occurred historically. Currently, moist forests (mixed conifer, moister Douglas-fir, white/grand fir and lodge pole pine) are denser with higher levels of ground fuels than what occurred historically.

Two forested areas currently contain the oldest and largest trees in the plan area. One is located in Timber Basin (less than 500 acres) at the south base of Rudio Mountain and the other is isolated near the north face of Aldrich Mountain (Big Canyon Creek, approx 1,100 acres). Both areas are similar and have old multi-story forest characteristics. They have some trees (ponderosa pine and Douglas-fir) in excess of 40 inches diameter at breast height (dbh) in the overstory and an understory of mixed conifers (both shade tolerant and intolerant species). Western larch communities are declining.

Under Alternative 1, forest management is focused on sustainable commercial harvest, minimizing losses from insects and disease, thinning; and maintaining site productivity. Alternative 1 allocates 135,719 acres as Timber

Management Units (TMU) where the primary focus of management is on timber production. This focus would result in less large structure habitat for species like white headed and pileated woodpeckers and reduced cover values for big game. Continuing current management direction would also result in further increases of live and dead fuels. This fuel buildup would eventually result in fires that reduce habitat quality and quantity for species dependant on large structure like the white-headed woodpecker.

Under Alternatives 2-5, approximately 40% of the forested habitat is identified as priority vegetation treatment areas (Map 4). Alternatives 2-5 propose greater amounts of mechanical and prescribed forested treatments than Alternative 1. Under the action alternatives habitats dominated by encroaching younger tree species, with accumulations of dead fuel or abundant uncharacteristic vegetation, would be targeted for treatment, thus increasing the quantity and quality of wildlife habitat for priority species. Under these alternatives, a portion of forested habitats would be further prioritized for treatments where they occur on big game winter ranges. The action alternatives also include a seasonal timing restriction and/or buffer distances for flammulated owl, Townsend's big-eared bat, mule deer, and elk, which would serve to help protect these populations (Table 2-5). Generally, vegetation management under the action alternatives would increase the habitat quality and quantity for most forest wildlife species.

Short- and Long-term Effects of Vegetation Treatment Types on Forested Habitat

All of the alternatives propose a similar amount of prescribed burning in forested habitats. However, Alternative 1 calls for suppression of all wildfires. Alternatives 2-5 allow for the use of AMR, which could result in more of the plan area burning.

Prescribed fire generally reduces undesirable tree species and or age classes and allows for better forest health. If fires are suppressed and prescribed burning or mechanical treatments are not used to restore and maintain forest health, a stand replacement event could eventually occur through insect or disease mortality and/or wildfire. Loss of large structure trees decreases habitat quality and requires many years for renewal of the habitat. Big game species would benefit from fire treatments, unless too much tree cover is removed. Prescribed and managed fires create mosaics of forage and cover for forest habitat wildlife species. Big game prefer foraging in burned compared to unburned areas, although preference may vary seasonally. This preference may indicate an increase in plant nutrients which usually occurs following fire.

Mechanical treatments would target shade tolerant understory trees much more specifically than prescribed fire. The use of mechanical treatments in forested habitats prior to prescribed fire will result in changes in seral structural conditions consistent with the currently identified ARV treatment needs. Mechanically treating dense forests, where canopy cover exceeds 40%, would improve the quality of the understory vegetation which increases the availability of ground and shrub nesting and foraging habitats, but would reduce cover values.

Over the long-term, moving the landscape towards a more viable and sustainable range in vegetative structure and composition will meet the needs of priority forest wildlife species. Alternatives 2-5 are expected to move the landscape more quickly toward viable stable ranges in vegetation than Alternative 1.

Snags and large down wood provide nesting/denning and foraging habitat for a host of priority wildlife species. Alternative 1 lacks specific direction on retention of large structure, snags and downed logs. The action alternatives provide direction for the retention of snags, large down wood, and old growth character trees. Snag and large down wood retention levels prescribed in the action alternatives are tied to the site productivities and densities expected under natural disturbances. Through time these within stand characteristics will add to the character of stands and enhance theire ability to meet large structure (old growth) objectives sooner and more completely than Alternative 1.

Summary of Vegetation Management Effects on Wildlife

The quantity and quality of wildlife habitat that would be produced under the action alternatives will come closer to meeting ARV objectives based on treatment types and amounts than Alternative 1. The targeted treatment types and prioritization of treatment locations based on resource values, including key wildlife habitats, in the action alternatives would balance current habitat shortages, provide a more appropriate balance of cover/forage and patch size conditions, and retain within stand characteristics such as snags, down wood, and old growth trees

more directly than Alternative 1. Consequently, the action alternatives are more likely through time to provide a balance of wildlife habitats across the planning area.

Cliffs, Canyons, and Caves

Appendix O lists Priority Species associated with cliff, canyon and cave habitats. Alternative 1 provides no specific guidance for management actions in cliff, canyon or cave habitats. The action alternatives also include a seasonal timing restriction and buffer distance for prairie falcon nests, bighorn sheep, and Spotted and cave-dwelling bats (Townsend's big-eared, Pallid, fringed myotis), which would help protect these populations (Table 2-5).

Short- and Long-term Effects of Vegetation Treatment Types on Cliffs, Canyons, and Caves

Vegetative treatments directly adjacent to cliffs and caves can alter the micro habitat of these sites, reducing their potential to be used as roosts, nests, or perches. Removing vegetation can also expose sites to predation or human intrusion. Alternative 1 contains no specific direction for the protection of vegetation immediately adjacent to these features, whereas the action alternatives do.

Vegetative treatments (both mechanical and prescribed fire) near, but not directly adjacent to cliffs and caves can benefit foraging habitat in these areas. Riparian and meadow habitats near cliffs provide foraging habitat for species like prairie falcon and golden eagle. Riparian and open forested habitats near cliffs or caves provide foraging opportunities for species like spotted bats and Townsend's Big-eared bats. Through time, increased ability to treat riparian habitats, emphasis on forested treatments, and greater amount of treatment expected under the action alternatives would result in more productive foraging conditions associated with cliffs and caves than under Alternative 1. The greater amount of fire treatments associated with the action alternatives would have more short term effects to individuals and localized populations; however, the majority of cliff, canyon, and cave species are highly mobile and can travel many miles to forage.

For bighorn sheep, fire generally improves and increases forage and increases visibility for escape. Fire treatments conducted on poor condition habitat may eliminate big horn sheep habitat. When non-sprouting plant forage is eliminated within the treatment area or when too much area is burned, forage would be inadequate until the next growing season.

Restoration of native vegetation through seeding would improve the quality and quantity of the habitats used by cliff, canyon and cave species. Alternative 1 provides no direction for the pattern or prioritization of restoration seeding. Under Alternatives 2-5, restoration seeding will be designed in a mosaic pattern which would increase the edge effect and would be a positive benefit to wildlife.

The specific direction in the action alternatives to manage vegetation to retain micro climates associated with cliffs and caves combined with the increased ability and amount of treatment to surrounding foraging habitats will provide better habitat quantity and quality that Alternative 1.

Fire and Fuels Management Effects on Wildlife

Under Alternative 1, 22,304 acres are designated as wildland-urban interface (WUI), which would continue to be managed to reduce hazardous fuels that pose a risk to communities at risk. Alternative 1 does not provide any more specific direction about fuels treatments around communities. Alternatives 2-5 provide direction to design fuels and vegetation treatments to consider not only public and firefighter safety, but also wildlife habitat and corridors in addition to other resource issues. Alternatives 2-5 also aim to achieve objectives for both hazard reduction in WUI and ARV across larger areas. The only exception would be the approximately 5,000 acres of BLM land where intense vegetation treatments would emphasize fire safety over wildlife values. The WUI objective of reducing fire hazard under Alternative 1 could result in more intense fuels treatments across the plan area than the Alternatives 2-5. Management under Alternative 1 would lead to more vegetative and habitat conditions outside the requirements for many priority species. The action alternatives would not.

The action alternatives designate 85,391 acres of WUI, 22,304 acres of Full Suppression, and 434,306 acres of AMR. Under the action alternatives, more acres of vegetation would be treated for community safety and to meet ARV objectives. In addition, outside of Full Suppression areas, the action alternatives require treatment projects to be

designed to assure balances between attaining ARV and FRCC objectives. This would improve the habitat quality and quantity for priority wildlife species more under Alternatives 2-5 than Alternative 1.

Alternative 1 lacks designated areas for AMR (including WFU) which would limit the ability to utilize natural fire starts to improve or maintain landscape health. Fuel treatments in the Full Suppression areas would continue to be for the primary purpose of reducing fire risk, and wildlife objectives would not be considered for those areas. Utilization of AMR under the action alternatives would reduce treatment needs to meet ARV objectives. This could achieve better habitat conditions quicker than Alternative 1, with greater benefits to priority species.

Effects of Aquatic Resource Management on Wildlife

Existing aquatic resource management direction under Alternative 1 provides guidance at the scale of the entire Interior Columbia Basin while Alternatives 2-5 generally provide more locally specific management objectives. This area specific management would result in attainment of a greater amount of wildlife objectives, including providing habitat to meet ODFW management objectives for deer, elk, and pronghorn antelope. Alternative 1 designates 51,260 acres to be managed for riparian objectives while Alternatives 2-5 identify 139,673 acres to be managed for riparian objectives. Alternative 2-5's 37% increase in the area managed for riparian values would increase habitat quality and quantity for priority wildlife species like the bald eagle and tricolored blackbird by providing more quality habitat for activities such as nesting, foraging and roosting.

Alternative 1 lacks any measures for attaining specified goals while Alternatives 2-5 identify measures of attainment to track progress in achieving management objectives through the life of the plan. This specificity would help to maintain and improve riparian habitats, which is consistent with supporting healthy, productive and diverse wildlife populations. Under Alternatives 2-5, approximately 35% of riparian areas are identified within plan area priority vegetation treatment areas.

Alternative 1 also does not propose any restoration, nor identify actions needed to attain restoration of riparian habitat. Alternatives 2-5 identify active restoration actions for riparian habitat with methods that include fire, mechanical treatment, seeding and targeted herbicide use. An increase in the health and vigor of the shrub and herbaceous layers are expected from attainment of aquatic restoration objectives and actions included in the action alternatives, which would improve palatability for big game species. The effects of fire, mechanical, seeding and herbicide treatments on priority species are described in more detail below.

Effects of Fire Treatments on Wildlife

Fire generally controls most encroaching undesirable woody species. The resulting increase in productivity and diversity of riparian plant communities would increase the associated wildlife habitat quality and quantity. All alternatives are similar in the expected amount of prescribed burning per year (Table 4-4); however, Alternative 1 calls for suppression of all wildland fires, while the action alternatives allow for the use of Appropriate Management Response (AMR). Alternatives 2-5's use of AMR would increase riparian wildlife habitat quality and quantity relative to Alternative 1.

Effects of Mechanical Treatments on Wildlife

Mechanical treatments in riparian areas generally control encroaching undesirable woody species. The resulting increase in diversity and productivity of riparian and aquatic plant communities would increase the associated wildlife habitat quality and quantity. Alternatives 2- 5 propose greater amounts of mechanical treatments in forestlands (Table 4-4) and in riparian areas for restoration purposes under the Aquatic Conservation Strategy (ACS), which would bring about greater increases in habitat quality and quantity of riparian associated species than Alternative 1.

Effect of Seeding on Wildlife

Seeding would increase habitat quality and quantity by restoring native habitats used by priority species. All alternatives include direction on the use of native seed. The action alternatives provide greater direction on the patterns of seeding and more specific BMPs for designing seeding actions to benefit wildlife than Alternative 1.

Restoration of native tree, shrub, and herbaceous vegetation would increase the year-round habitat, forage, and cover for riparian wildlife species, potentially to a greater degree in the action alternatives than Alternative 1.

Effects of the Use of Herbicides on Wildlife

Herbicide use for noxious weed control would be used to restore riparian habitat for associated wildlife species. The alternatives do not differ in terms of direction on herbicide use, but the action alternatives, through the ACS, provide for the use of herbicides to achieve aquatic objectives for native plant diversity and stream function. Eliminating and/or reducing weedy species would help maintain or increase existing priority wildlife species habitat quantity and quality, possibly to a greater degree under the action alternatives than Alternative 1.

Effects of Livestock Grazing Management on Wildlife

Grazing allotments under all alternatives are classified into the following six livestock grazing authorization categories (also see Livestock Grazing, Chapter 2, and Appendix J):

- 1 Open
- 1 Close now
- 1 Open or Reserve Forage If Permit Relinquished (IPR)
- 1 Reserve Forage IPR
- 1 Close or Reserve Forage IPR
- 1 Close IPR

Some grazing allotments would remain open or be closed upon implementation of the RMP. As noted above, others would close only (and if) the grazing permit were relinquished (IPR) and if existing ecological and/or social conflicts with livestock grazing are not mitigated.

For the purpose of this analysis, acreages in each permit/allotment availability category have been combined as follows:

- 1 **Open:** Allotments were considered "Open" if they are now open for grazing or would be classified as either "Open" or "Reserve Forage" Allotments if the grazing permit were relinquished (IPR).
- 1 **Reserve Forage:** Allotments were considered "Reserve Forage Allotments" if they would be classified only as Reserve Forage if the grazing permit were relinquished (IPR).
- 1 **Close:** Allotments were considered "Closed" to grazing if they would be classified as Close or Reserve Forage Allotments, or simply Close if the grazing permit were relinquished (IPR).
- 1 **Close now:** Allotments that would be closed whether the permit is relinquished or not ("Close now") were not combined with any other categories for this analysis.

The resulting percent of the BLM plan area within each of these combined categories are summarized in Table 4-12.

Table 4-12. Percent of BLM lands in the plan area by livestock grazing authorization availability category as combined for wildlife effects analyses (see text).

Category	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative5
Open (%)	89	41	41	19	41
Reserve Forage (%)	0	1	1	22	1
Close (%)	0	57	57	56	57
Close Now (%)	11	1	<1	3	1

In Alternative 1, almost all grazing allotments would be Open over the life of the plan (Table 4-12). The action alternatives would in general have a greater amount of area un-grazed on a consistent basis. Livestock grazing

can reduce herbaceous cover available for priority wildlife like sage-grouse, pygmy rabbit, and big game. Grazing can also improve forage palatability for big game or increase accessibility of insects for species like turkey. The risk of forage competition between livestock and big game would be the greatest under Alternative 1, assuming all grazing permits are relinquished over the life of the plan. If competition did occur, it is not expected to be at levels that would threaten achieving ODFW management goals. Under all alternatives, annual adjustments in the timing, duration, or location of grazing uses would allow for adjustments necessary to address grazing management issues associated with wildlife habitat identified through Standards and Guides or other processes on allotments that are being grazed.

The likelihood of disruptions to nesting or other activities of priority species such as the grasshopper sparrow by livestock grazing activities would be the greatest under Alternative 1 (with almost 90% of BLM allotments open to livestock grazing; Table 4-12) and the least under Alternative 4 (with only 19% of BLM allotments open to grazing). Alternatives 2, 3 and 5 would fall in the middle with 41% of BLM plan area Open to grazing. Livestock water source developments under any alternative would provide additional sources of drinking water for wildlife. However, the expansion of grazing impacts in previously unused areas following water development and fence construction would reduce the amount of ungrazed or lightly used forage for wildlife. This forage is preferred or more productive for some species of wildlife.

The necessity for additional livestock fencing would increase the likelihood of unavoidable disruption to the movement of some priority big game (e.g. elk) and could increase their vulnerability to predation, injury or death due to collision or entanglement. Where there is a wildlife need for escape from human disturbance or where heavy snow cover conditions are present, death losses or injury attributable to fencing can result. While the amount of fencing is not specified in any alternative, any shifts from Open to Reserve Forage or Closed (given permit relinquishment) under the action alternatives could include the need for fencing with potential adverse effects to wildlife movement. Properly designed fencing reduces the likelihood of death or injury to wildlife, but it does not completely eliminate it.

Under Alternative 1, nongame species habitat would be provided largely as a by-product of meeting management objectives for game species rather than as a proactive nongame management objective. Current management direction does allow for some limited proactive measures to specifically benefit nongame species. Alternative 1 would result in upland habitat diversity and structure for nongame species that is evident at a mid scale but frequently lacking, or with reduced habitat values at the fine scale due to the livestock commodity emphasis.

Alternative 4 would provide for the highest level of quality forage, cover, and structure for wildlife since areas unallocated to livestock grazing would provide for a very high level of quality forage, cover, and structure in sagebrush, mountain shrub and other upland species habitats. Unallocated areas would become reserves in which the combined values of forage, cover, and structure would be maximized for wildlife such as antelope, deer and elk. The absence of livestock trampling and utilization would increase herbaceous cover. Assuming grazing occurred during reproductive seasons, the lack of grazing would reduce the amount of ground nests destroyed or disrupted and potential for localized forage competition between livestock and big game.

Based on the preference of some animals, such as elk, to seek out areas periodically grazed, an increase in the amount of wildlife use on private land would be likely to occur in several local areas. Under Alternative 4, cumulative consequences could result from changes in wildlife use, such as shifts of big game onto private land. These effects would be mitigated by periodic light grazing and /or prescribed burning during seasons which have the least effect on wildlife species in the area. The potential for big game movement to private lands could be less under Alternatives 2, 3, and 5 as more grazed (preconditioned) forage would likely be available compared to Alternative 4. Beneficial impacts to wildlife forage, cover, and structure would be accrued in virtually all of the alternatives where grazing use is removed. However, big game may still move on to adjacent private lands to seek preconditioned forage if not enough is provided on BLM lands.

Alternative 4 would benefit priority wildlife species the most as it would have the highest amount of acreage that would be closed to grazing and the lowest amount open (Table 4-12). Upon signing of the Record of Decision (ROD) Alternatives 2 and 5 would both have 1% closed and 41% open to grazing, Alternative 3 would have 0% closed and 41% open, followed by Alternative 1 at 11% closed and 89% open.

Effects to wildlife associated with wild horse management include competition with big game for water resources during droughts, and local depletion of adequate forage and cover for wildlife. Under drought conditions, the

presence of wild horses would increase competition for water which would periodically result in additional mortalities of pronghorn antelope, and to a much lesser extent, mule deer. The size and allocation for the wild horse herd management area does not differ between alternatives; hence, there would be no measurable differences in effects to wildlife between alternatives.

Transportation Management and OHV Effects on Wildlife

> "In summary, no terrestrial vertebrate taxa appear immune to the myriad of road-associated factors that degrade habitat or that increase mortality" (Quigley 2000). 1

Transportation management actions that effect wildlife include: prescribed, interim, and cumulative road densities, habitat security and seasonal restrictions, Scenic Byway designation, Class II rock crawling areas, and OHV designations. Each of these actions can be related to general wildlife effects, namely habitat loss, fragmentation, wildlife displacement, and mortality. The effects of each of these actions on wildlife are reviewed separately below, and are followed by a synthesized summary of effects of Travel Management.

In general, effects of road-associated land management can be direct, such as habitat loss and fragmentation as a result of road construction and maintenance. Effects can also be indirect, such as displacement or increased mortality of wildlife populations in areas near roads in relation to motorized traffic and associated human activities. High speed roads (state highways and paved county roads outside of the jurisdiction of BLM) have the greatest potential for direct mortality to individual animals (Gunter *et al*. 1998). Roads increase fragmentation of habitats. State highways and paved county roads contribute the most to fragmentation, as they usually have shoulders and require additional clearing of vegetation. Road surfaces and higher levels of traffic create a barrier to movement for some (mostly smaller) species. Under all alternatives, most roads under BLM management have a native surface, are rarely maintained, and do not have shoulders or extra vegetation clearing. This reduces potential effects of fragmentation compared to state highways and paved county roads.

While road density in and of itself may not be the best measure of habitat effectiveness for wildlife (e.g., Rowland *et al.* 2000), the Interior Columbia Basin Ecosystem Management Project (ICBEMP) did one of the most extensive reviews of road related effects on wildlife to date, and provides a larger context for the discussion of these effects on wildlife. While not prescriptive, ICBEMP used the following road density categories, which are assumed to correspond to varying levels of wildlife habitat quality: none to very low (0 - .1 mi/mi^2), low (.1 - .7 mi/mi^2), moderate (.7 – 1.7 mi/mi^2), high (1.7 – 4.7 mi/mi^2), or extremely high (4.7+ mi/mi^2) (Quigley and others 1996). In general, road densities greater than 2 mi/mi^2 reduce habitat security, increase fragmentation, and increase the indirect effect of human activities. The following discussion utilizes ICBEMP categories, and the general 2 mi/mi^2 threshold in-part to analyze differences in effects between alternative travel management and OHV direction.

The action alternatives contain both BLM prescribed and BLM interim road densities (defined below). Cumulative road densities from the entire plan area are used to provide a larger context to the effects analysis.

- **Prescribed road densities** represent road density objectives to be used in transportation planning for each Travel Management Area. Prescribed road densities are specified for the action alternatives (Table 4-13, Maps 13a-f and 14a-f), but not for Alternative 1 (except indirectly in the case of WSAs).
- **Interim road densities** represent the road density that would exist in each Travel Management Area until a Travel Management Plan or site specific plan is completed.
- **Cumulative road density** represents the road density by inclusion of roads within one mile of BLM land, regardless of ownership. The BLM has no control over these additional roads. However, the existence and use of these other roads affect wildlife and their habitats on BLM lands. These cumulative road densities were analyzed to determine the relative contribution of the effects of each alternative and the relative ability of BLM to influence road related effects. Cumulative open road density was calculated using a 1 mile roving window (see ArcGIS 9.2, line density tool).

Prescribed Road Densities

Road density prescriptions set a course of action for travel and access management that takes the needs of wildlife into account. Without road density prescriptions the number and spatial distribution of roads resulting from management would through time, have uncertain or varying effects on wildlife. Alternative 1 does not prescribe road densities; it would continue management of the existing transportation network. Under the action alternatives, prescribed road densities (calculated on all motorized routes on BLM lands) would be implemented during planning of individual projects or during the development of the Travel Management Plan. Prescribed road densities are averages that are relevant at the level of the Travel Management Area. For instance, individual parcels of BLM land may have densities greater than 2 mi/mi^2; however, all BLM lands within a prescription of 2 mi/mi^2 must average 2 mi/mi^2 or less across the Travel Management Area (Table 4-13).

Under the action alternatives, road densities would be prescribed within each of six individual Travel Management Areas (Map 26) based on the need to reduce impacts to key wildlife habitats (see glossary) and provide recreation opportunities consistent with recreation management objectives (see Maps 13a-f and 14a-f, Table 4-13, and Travel Management in Chapter 2). Table 4-13 compares prescribed road densities within each Travel Management Area among alternatives.

If roads are managed under the action alternatives to the allowable density, prescribed road densities in the Upper John Day, Lower John Day, Rudio Mountain, and Sutton Mountain areas would be moderate relative to ICBEMP road density categories. The North Fork and South Fork would be in the high category.

Table 4-13 Average Allowable Road Density, Interim Road Density, and Approximate Priority Community Composition* by Alternative**

Travel Management Area	Average Allowable Road Den. ** (mi/mi^2)	Interim Road Density (mi/mi^2)			Priority Community Composition					
		Alt. 1	Alt. 2, 4, 5	Alt. 3	Grassland	Shrubland	Juniper	Forest	Riparian	Cliffs & Canyons
Upper John Day (9,196 ac. BLM)	1.15	3.5	1.5	3.5	0%	9%	0%	86%	5%	Low
Lower John Day (119,703 ac. BLM)	1.26	1.2	0.4	1.1	10%	85%	0%	0%	5%	High
North Fork (53,884 ac. BLM)	2.00	0.6	0.8	2.3	1%	37%	2%	55%	5%	Medium
Rudio Mountain (82,086 ac. BLM)	1.04	1.4	0.4	1.4	5%	46%	2%	45%	2%	Medium
South Fork (62,973 ac. BLM)	2.00	1.7	0.6	1.6	1%	60%	1%	35%	3%	High
Sutton Mountain (128,768 ac. BLM)	1.35	1.3	0.7	1.3	15%	81%	1%	1%	2%	Medium

* See Appendix O for the specific wildlife species addressed by the Priority Community. See Appendix F for groupings of BpSs into Priority Communities. Approximate BpS compositions are based on visual estimates. Because Cliffs and Canyons are not a vegetative component, a percentage calculation was not appropriate, so a relative scale of occurrence is provided.

** Average road density is based on percent composition of the Travel Management Area designated in each of the two prescribed road density standards (0 mi/mi^2 or 2 mi/mi^2). Averages display the maximum allowable road density; however, road densities may not be managed at the maximum allowable level. Prescribed road densities are a component of Alternatives 2, 3, 4, and 5 only. Prescribed road densities do not include seasonal closures and thus reflect conditions outside of restricted periods (See Maps 12a-f and 13a-f for Seasonal Restrictions). Wilderness Study Areas in Alternative 1 do not have a prescribed road density; however, existing management direction would preclude any new road construction. Interim and average road densities are based on roads on BLM lands only. Areas with no upper limit to road density for the action alternatives were not included in these figures (approximately 6,000 acres primarily in the Rudio Mountain area).

Figure 4-7 and Table 4-14 illustrates the percentage and acres of key wildlife habitats in each road density category, as depicted by the upper limits of allowable road density. “No limit” means that no road density

prescription has been proposed for these lands or alternative. These upper limits are considered the maximum density allowed to meet wildlife and recreation objectives; they do not necessarily represent the actual road densities that would be maintained over the long term (actual road densities could be less).

Over 95% of all key wildlife habitats would have a prescribed road density under the action alternatives, as opposed to 0% in Alternative 1. The lack of direction for allowable road densities under Alternative 1 assumes a greater risk for road related effects to wildlife and their habitats from future actions than the action alternatives.

Figure 4-7. Percentage of Key Wildlife Habitats by Prescribed Road Density Class on BLM Lands

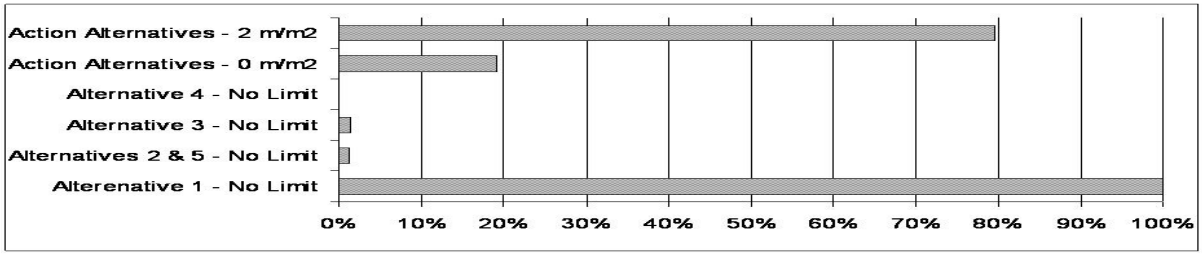


Table 4-14 shows that under Alternative 1, elk summer, and deer and elk winter ranges have the largest amount of area with no road density limits, and hence the largest future risk for wildlife habitat degradation. Differences in seasonal restrictions further distinguish differences in effects among the alternatives, and will be discussed in the habitat security and seasonal restriction section below. While sage grouse and Washington ground squirrel make up a smaller proportion of the plan area than other key habitats, 100% of their habitats would have road density limits under the action alternatives as opposed to 0% under Alternative 1. The action alternatives vary from each other only in that Alternative 4 has road density limits for all key wildlife habitats. About 2,500-5,100 acres in deer and elk winter range and elk summer range would not have road density limits under Alternatives 2, 3 and 5.

Table 4-14. Acres of Key Wildlife Habitat by Prescribed Road Density Class on BLM Lands.

Key Habitats	Alternative 1 No Limit	Alternatives 2 & 5 No Limit	Alternative 3 No Limit	Alternative 4 No Limit	Action Alternatives 0 mi/mi²	Action Alternatives 2 mi/mi²
Antelope Year Round	13,709	0	0	0	58	13,651
Deer Summer	34,676	0	0	0	5,036	29,630
Deer Winter Range Crucial	255,038	4,486	5,087	0	58,331	191,592
Elk Summer	348,467	4,486	5,015	0	100,465	242,929
Elk Winter Range	209,044	2,477	2,477	0	31,436	175,098
Elk Winter Range Critical	109,887	2,477	2,477	0	2,004	105,399
Sage Grouse	58,192	0	0	0	0	58,192
Washington Ground Squirrel	6,329	0	0	0	0	6,329

Alternative 1 does not limit road densities in any of the Priority Communities with the exception of WSAs. The majority of WSAs have a shrubland Priority Community type. Conversely, the action alternatives provide the following approximate percentages of area by Priority Community and prescribed road density:

	2 mi/mi²	0 mi/mi²	No limit
Grasslands	50%	50%	0%
Shrublands	65%	34%	1%
Juniper	30%	70%	0%
Forest	85%	15%	0%

Greater direction for future transportation planning reduces the risk of road management allowing road density effects to wildlife. The majority of acres of Priority Communities and Key Wildlife habitats have No road density limit in Alternative 1, as opposed to less than one percent in the action alternatives.

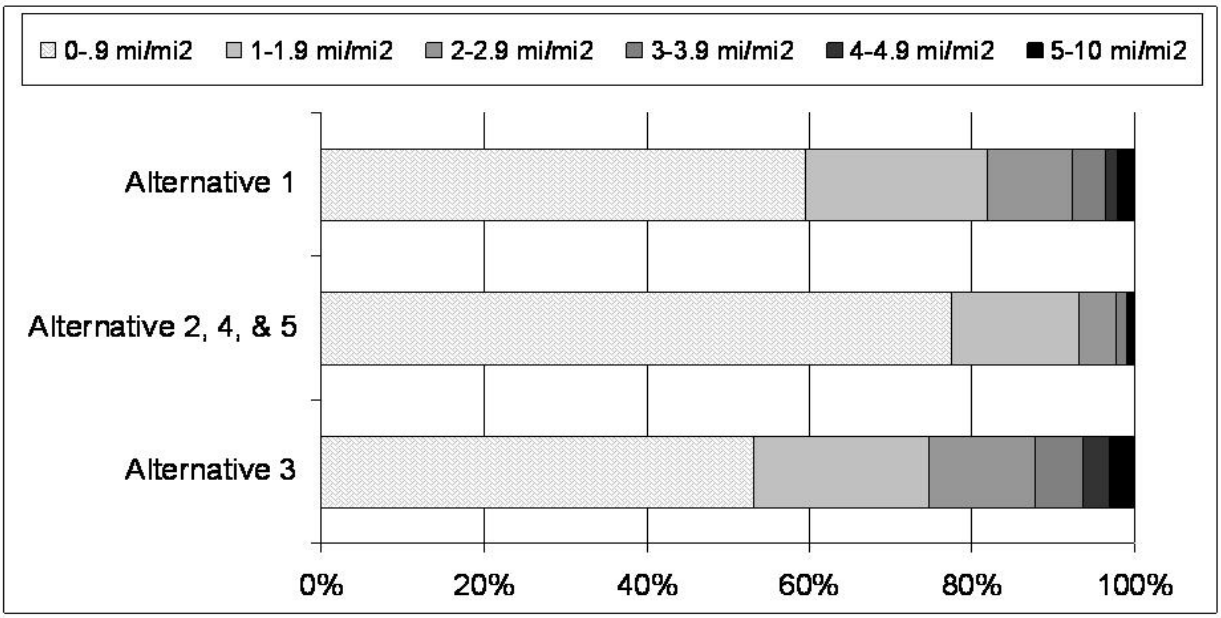
Interim Road Densities

All alternatives designate interim roads until a final Transportation Management Plan (TMP) is completed. Interim road densities may exist for five or more years. Implementation of a final transportation network depends on when a TMP can be completed and implemented. The action alternatives require that each new project meet the prescribed road densities regardless of whether a TMP is completed or not. Alternative 1 would maintain the existing transportation system, and manage projects on a case-by-case basis without constraints on road density. In the interim, the action alternatives will take a more proactive approach to transportation management and reduce effects of roads on wildlife more than Alternative 1.

Under Alternative 1, for the life of the plan, the Upper John Day Travel Management Area (TMA) would remain in the high density category, as defined by ICBEMP. Of all the alternatives, Alternative 1 has the lowest interim road density in the North Fork TMA area. Interim road densities for Alternative 2 and 3 in the Upper John Day TMA, and Alternative 3 in the North Fork John Day TMA currently exceed the prescribed road density limits, so future road closures would be necessary to meet wildlife objectives.

Road densities greater than 2 mi/mi2 reduce habitat security, increase fragmentation, and increase the indirect effect of human activities. Figure 4-8 displays that the majority of BLM lands within key wildlife habitats are within the 0-1 mi/mi^2 category regardless of alternative. Under Alternative 1, approximately 19% of key habitats would have an interim road density of 2 mi/mi^2 or more (high to extremely high relative to ICBEMP categories), while Alternatives 2, 4, and 5 would have only about 8% of key habitats in this category. Alternative 3 has the highest percentage (26%) in the high to extremely high road density category.

Figure 4-8. Percentage of Key Habitats by Interim Road Density Calculated on BLM lands



Interim road densities by alternative and key wildlife habitat for BLM lands are displayed in Table 4-15. Alternative 1 and to a greater extent Alternative 3 have higher interim road densities than Alternatives 2, 4, and 5 in all key wildlife habitats. The effects of the higher interim road densities in Alternatives 1 and 3 are most pronounced in elk summer, deer and elk winter range, and Washington ground squirrel habitat.

Bate and Wisdom (2002) found that areas near roads (both open and closed) had significantly fewer snags than areas further from roads in forests of Northeastern Oregon. This was particularly true if the areas were close to towns. BLM lands in the Upper John Day and South Fork TMAs have the closest proximity to towns, while the

Rudio and North Fork TMAs are the furthest. Based on the relative abundance of forest habitat and allowable road densities between Travel Management Areas (Table 4-13), habitat for wildlife species in the forest Priority Community (Appendix O) would risk losing snag habitat in the Upper John Day TMA and to a lesser extent the South Fork area under Alternatives 1 and 3.

In Alternative 1 the North Fork is the only forested area that would not fit in the moderate to high road density category based on open interim roads. The majority of forested communities in Alternative 3 are in the high interim road density category. Alternative 2, 4, and 5 have interim road densities in the low to moderate range except in the Upper John Day TMA.

Table 4-15. Acres of Key Habitats by Interim Road Density Category and Alternative on BLM Lands

Key Habitat	Alternative	0-0.9 mi/mi²	1-1.9 mi/mi²	2-2.9 mi/mi²	3-3.9 mi/mi²	4-4.9 mi/mi²	5-10 mi/mi²
Antelope Year Round	1	9,587	3,227	331	520	5	40
	2, 4, 5	13,010	592	108	0	0	0
	3	9,615	3,227	303	520	5	40
Deer Summer	1	15,120	6,414	3,869	2,631	1,862	4,780
	2, 4, 5	25,743	2,415	3,735	1,308	243	1,233
	3	13,256	6,152	3,871	3,890	2,885	4,624
Deer Winter Range Crucial	1	154,683	56,550	26,681	11,255	3,317	2,553
	2, 4, 5	194,303	42,513	12,882	3,415	988	937
	3	136,354	54,700	35,789	14,799	7,593	5,803
Elk Summer	1	209,345	74,379	34,381	16,254	5,443	8,665
	2, 4, 5	275,387	50,388	14,166	4,342	1,474	2,710
	3	195,892	72,535	38,720	18,540	10,518	12,262
Elk Winter Range	1	130,481	48,959	19,398	5,821	1,738	2,647
	2, 4, 5	161,266	34,907	8,869	2,079	752	1,172
	3	106,562	44,838	29,184	12,702	9,089	6,668
Elk Winter Range Critical	1	60,971	29,907	11,697	4,322	955	2,035
	2, 4, 5	80,750	21,348	5,579	1,087	322	801
	3	52,195	28,327	17,201	7,274	2,597	2,292
Sage Grouse	1	32,923	12,752	8,204	2508	809	996
	2, 4, 5	46,388	9,387	1,802	282	283	50
	3	34,114	13,557	7,552	1,203	770	996
Washington Ground Squirrel	1	2,377	641	1,992	1,041	0	278
	2, 4, 5	5,574	517	0	0	159	80
	3	2,377	641	1,992	1,041	0	278

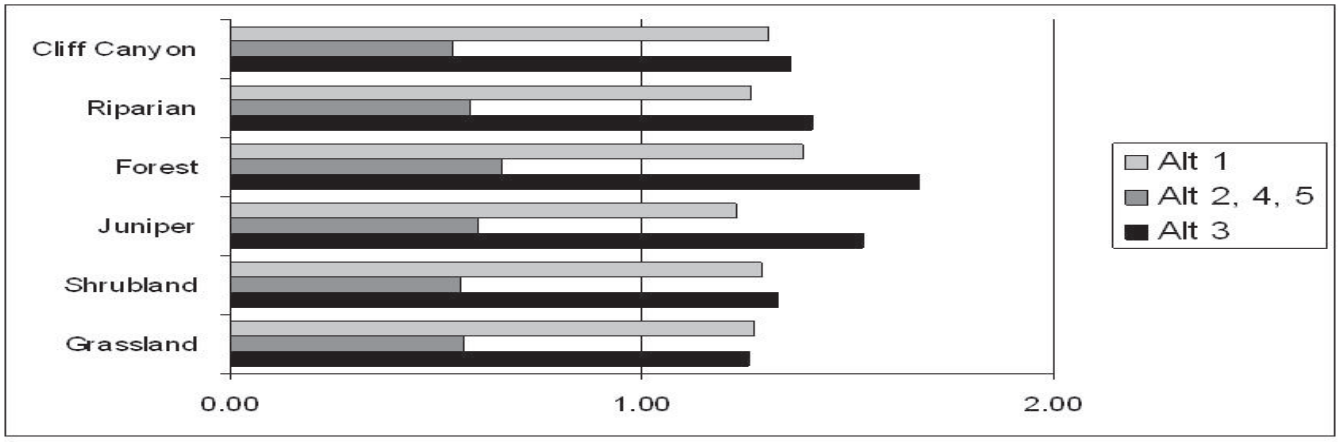
Roads not designated as interim will in general not have physical closures on them, and thus will likely continue to receive some level of use. Havlick (1995) reviewed 802 road closure sites. Of these, 73% were not fully closed as intended due to lack of compliance. It is impossible to quantify the level of compliance expected under this RMP, but assuming there will be an equal level of compliance among alternatives, the loss of wildlife habitat and snags would be less in Alternative 2, 4, and 5 than Alternatives 1 and 3.

Alternative 3 will have the highest open road densities in the interim of all of the alternatives.
Both the North Fork and Upper John Day Travel Management Areas would be in the high category with the

remaining areas in moderate for BLM lands. The North Fork area includes is important habitat for several species including Lewis' woodpecker. The proposal to open numerous roads that are currently closed in the North Fork area would reduce surrounding wildlife habitat quality and quantity, including snag densities (Bate 2002).

Interim road densities are generally less than 2 mi/mi^2 under all alternatives and on all Priority Communities, except riparian and forest (Figure 4-9). Alternative 1, and to a slightly greater extent Alternative 3 have higher road densities (moderate category) than Alternatives 2, 4, and 5 (low category) in all Priority Communities, especially forest and juniper.

Figure 4-9. Approximate average road density by alternative within Priority Communities - BLM Only*



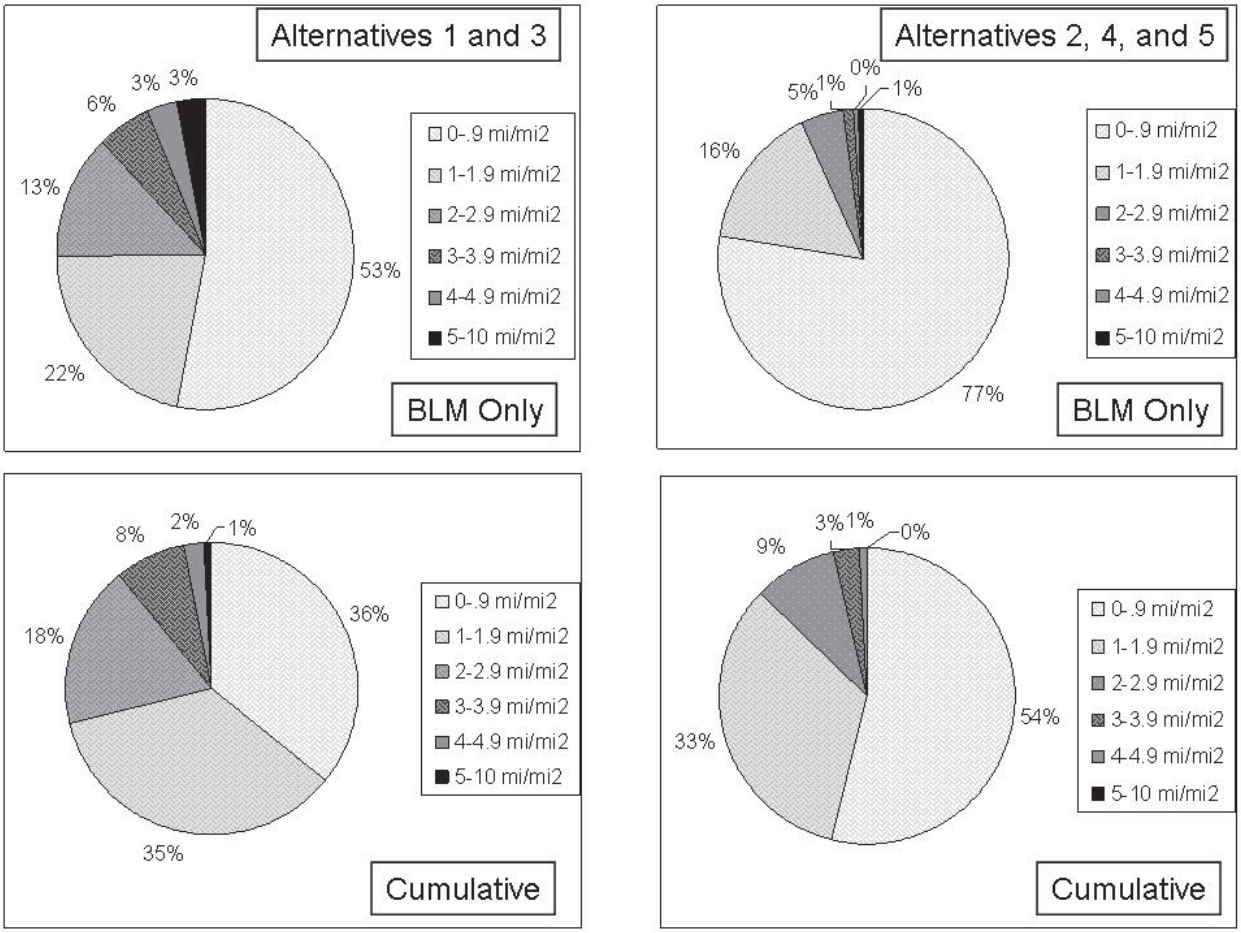
*The numbers in this figure represent averages based on the estimated percent composition of each Priority Community by area in each road density category.

Cumulative Road Density

The BLM has no control over the management of roads on surrounding lands; however, the existence and use of these roads have effects on wildlife and their habitats on and off BLM lands. The interim road densities vary by alternative relative to cumulative road densities. Figure 4-10 shows the type and magnitude of differences between alternatives in road density on BLM versus all land ownerships surrounding BLM. These data also show the BLM's ability to influence road related effects. Figure 4-10 shows that on BLM lands under Alternatives 1 and 3, 53% of key wildlife habitat would be in the 0-.9 mi/mi^2 category (very low to moderate) and 25% would have road densities >2 mi/mi^2 (high to extremely high). Under Alternatives 2, 4, or 5, 77% and 7% of key habitat would be in the 0-.9 mi/mi^2 and >2 mi/mi^2 categories, respectively.

All alternatives would result in greater percentages of habitat in the higher road density categories for cumulative road densities than interim densities based solely on BLM roads (Figure 4-10). This is most pronounced in deer summer range, sage grouse habitat, and elk winter crucial range. The influence of surrounding roads is more significant in Alternative 1 and 3 due to the higher level of interim open roads in these alternatives. Under Alternatives 1 or 3, 36% of key wildlife habitat would have a cumulative road density of 0-.9 mi/mi2 category (very low to moderate) and 29% would have cumulative road density >2 mi/mi^2 (high to extremely high). Under Alternatives 2, 4, or 5, 54% and 13% of key habitat would be in these categories, respectively.

Figure 4-10. Percentage of Key Habitats by Road Density Category Calculated on BLM Lands Only Versus Cumulatively (All Roads within 1 mile of BLM)



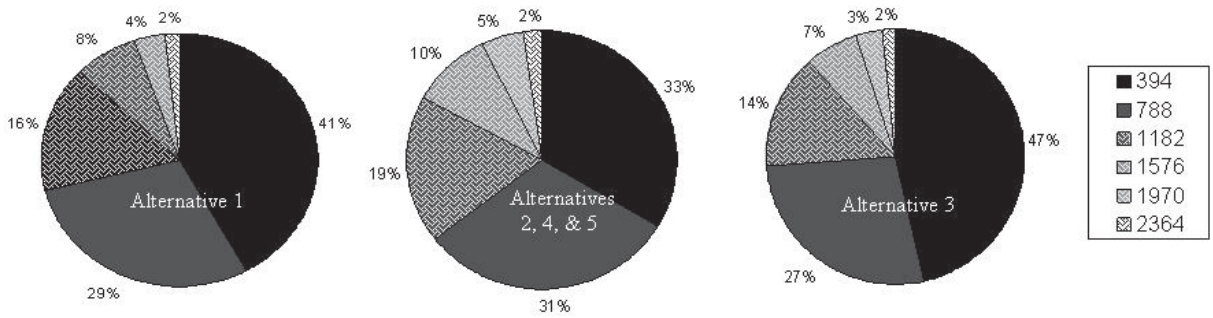
Habitat Security

The majority of studies of road related effects have been associated with big game. Lyon (1983) found that in general security habitat became more effective the farther it was from an open road. Some of the more recent studies have found that road density in and of itself may not be the best measure of habitat effectiveness for elk. Rowland *et al.* (2000) found that there was no significant relation between number of elk locations and habitat effectiveness modeling based on road densities. Habitat effectiveness models attempt to predict the percentage of available habitat that is usable by elk outside the hunting season. They proposed the use of a road banding method (see Data, Methods and Models in the introduction to this chapter) to better predict habitat reduction based on roads. Figure 4-11 displays the amount of all key wildlife habitats within the given distance (band) from an open road, while Figure 4-12 shows the amount of each key habitat within a given distance from an open road. Values in Figure 4-11 and 4-12 reflect all roads, not just BLM roads. Bands are often numbered, with band 1 being the closest to a road (0-394 yards), with bands 2, 3, 4, 5 and 6 occurring at 395-788 yards, 789-1,182 yards, 1,183-1,576 yards, 1,577-1,970 yards and 1,971-2,364 yards, respectively.

Adverse effects to wildlife and their habitat are generally greater closer to an open road. Figures 4-11 and 4-12 represent the varying level of effect from darker color (394 yards from an open road) having the least habitat security to lighter color (>2,364 yard from an open road) have the most habitat security. While there are differing levels of habitat security in each band, Rowland (2005) found that for elk, habitat use increased at 1,182 yards or more from roads.

All key habitats have higher percentages of secure habitat in Alternatives 2, 4, and 5 than would exist under Alternatives 1 and 3. This is particularly true in antelope year round and Washington ground squirrel habitats. The potential for shooting of ground squirrels from open roads is a threat to small populations like the Washington ground squirrel.

Figure 4-11. Percentage of Key Wildlife Habitats on BLM Lands by Road Band (Yards)*



*Because security habitat is affected irrespective of road ownership, all open roads in the plan area where used for this analysis.

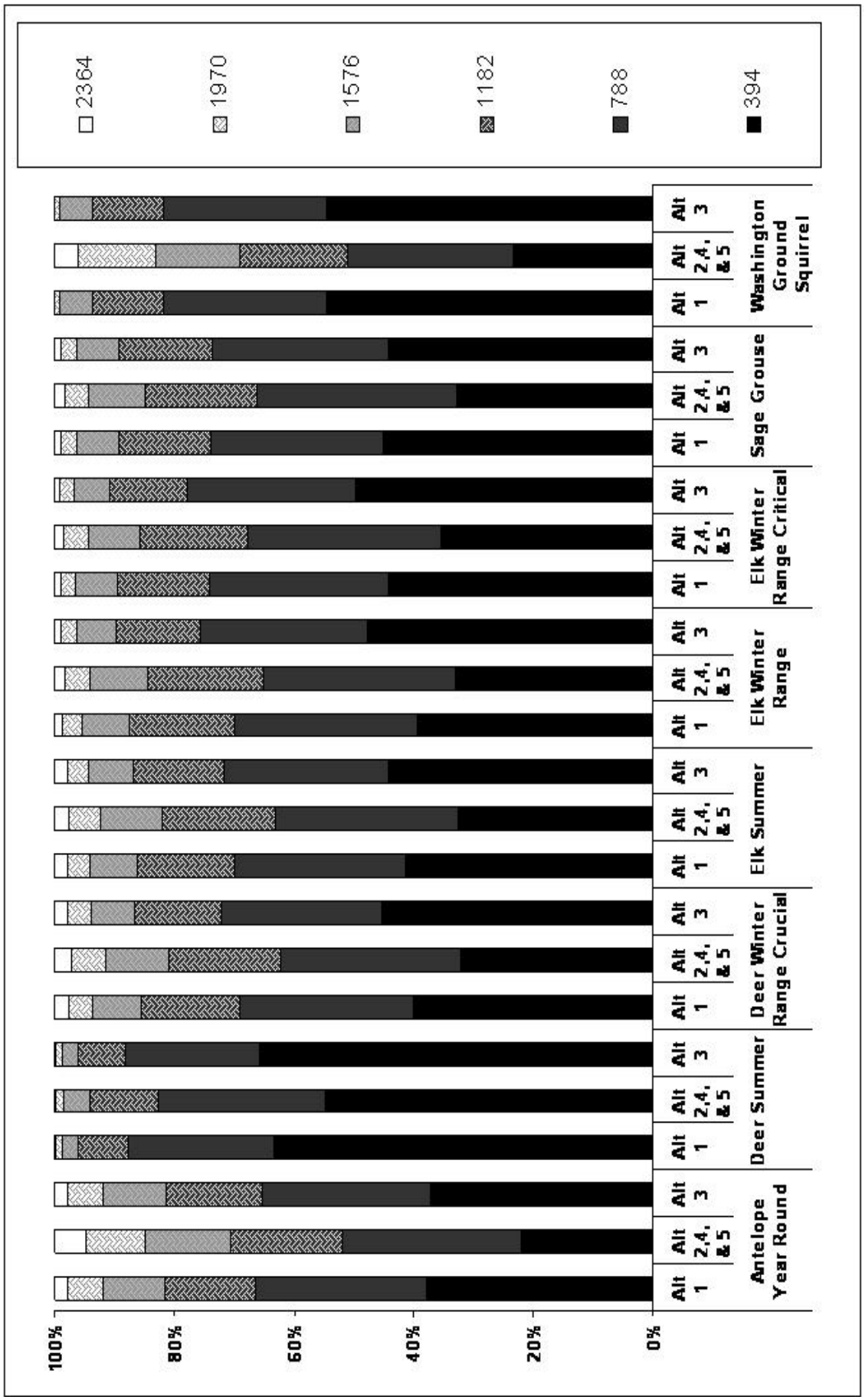
In Alternatives 1 and 3, the majority of grassland, shrubland, and juniper Priority Communities are within the first two bands (0-788 yards from an open road). For forest and riparian communities, the majority is within the first band. The exception being in the North Fork area where Alternative 1 retains most of the forest and shrublands in bands 2 - 4 with approximately 40% of the area greater than 1,182 yards from an open road. Alternatives 2, 4, and 5 increase the amount of forest habitat within bands 2-3 and increase the amount of area in band 4+ to approximately 30% for the grassland and shrubland communities. Riparian communities remain primarily within the first band with some localized reductions.

As Figures 4 –11 and 4-12 illustrate, 79-96% of key habitats would be within the first three bands (< 1,182 yards) in Alternatives 1 and 3 versus 67-94% in Alternatives 2, 4, and 5. The greatest difference is in the number of acres in bands 1 and 2 with Alternatives 1 and 3 averaging near 80% and Alternatives 2, 4, and 5 averaging near 60%.

Seasonal Restrictions

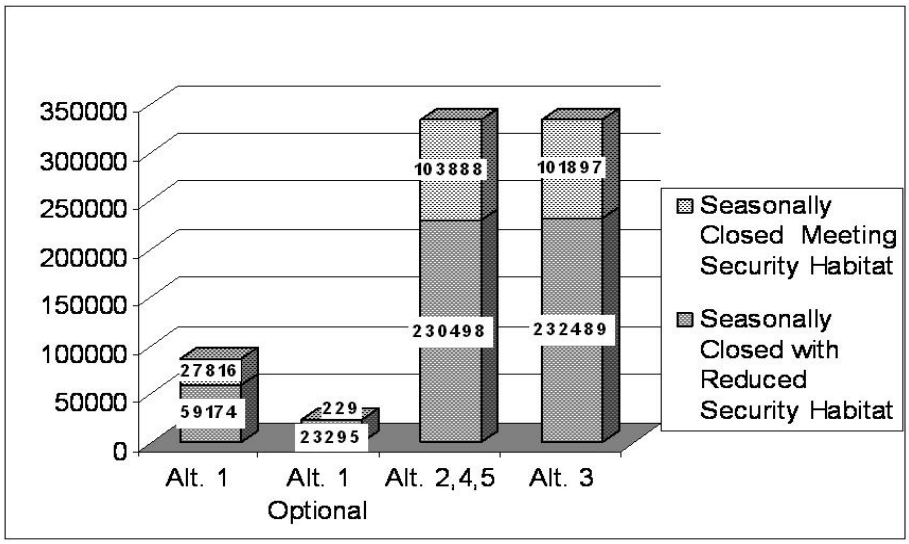
Winter is a trying time for most wildlife. The most studied and noted being big game. Disturbance on wintering habitats can cause animals to utilize critical energy reserves and avoid foraging areas with the highest quality forage. Alternative 1 currently provides seasonal road closures on 86,990 acres. The action alternatives propose seasonal closures on approximately 333,886 acres, or almost four times the amount of area than under Alternative 1. Within these seasonal closures there are roads that remain open year round (State and County roads Maps 12a-f and 13a-f).

Figure 4-12. Percentage of Key Wildlife Habitats on BLM Lands by Road Band (Yards) and Alternative*



*Because security habitat is affected irrespective of road ownership, all open roads in the plan area where used for this analysis.

Figure 4-13. Acres of Security and Reduced Security Habitat on BLM Lands within Seasonal Closures by Alternative*



*Because security habitat is affected irrespective of ownership of the road all open roads in the plan area where used for this analysis.

Figure 4-13 shows the amount of area expected to provide security habitat (> 1,182 yards from an open road) during the critical closure period. Areas within a seasonal closure may still be within 1,182 yards of an open road due to being on the edge of the closure area or adjacent to a year round open road within the seasonal closure (seasonally closed with reduced security habitat).

The depicted amount of seasonally closed area with reduced habitat security is higher than what would actually occur on the ground for the following reasons: 1) many of the roads that are considered open for this analysis are on adjacent lands and the public would have no access to them, and 2) some roads accessed through Forest Service lands would be snowed out at higher elevations (most years) or seasonally closed by the Forest Service. Optional closures under current management (Alternative 1) have not been utilized over the last 20 years and would not likely be implemented in the future.

Figure 4-13 illustrates that the action alternatives would provide far greater amounts and distribution of secure habitat during the winter than Alternative 1. Alternative 3 differs from Alternatives 2, by about 600 acres, and Alternatives 2 and 3 differ from Alternative 4 and 5 by approximately 5,000 acres in areas designated as open to OHVs that would not be seasonally closed.

Effects of Scenic Byway around Sutton Mountain

Alternative 1 does not propose creation of a scenic byway around Sutton Mountain or elsewhere so use levels on the Burnt Ranch road would continue at existing levels. The action alternatives propose a scenic byway around Sutton Mountain. It is hard to estimate exactly how much of an increase in road use would occur as a result of this designation, but it can be assumed that road use would increase especially during the summer tourism months. Both deer and elk move across this road extensively through out the year. The increased use under Alternatives 2-5 would not create a movement barrier but might increase stress and potential for collisions more than Alternative 1.

Class II Rock Crawling Area

Alternative 1 does not propose a class II rock crawling area; however, much of the plan area is open to off road vehicle travel, so it is likely that the demand for this activity would continue. The use would be dispersed across the landscape and continue to be unmanaged by the BLM. The action alternatives would designate trails which would likely increase the use in the designated area. Under the action alternatives, signing and designation may increase authorized and unauthorized use across the plan area. The risk of disturbing wildlife would be high near

designated trails but wildlife disturbance would be isolated to a specified location, and if use is directed to these areas the level of use across the rest of the plan area would be reduced.

OHV Designation Effects on Wildlife

The primary effect on wildlife of OHV use is related to disturbance. Habitat destruction is usually localized with the exception of the spread of noxious weeds. The greater amount of off road use permitted, the greater the potential spread of noxious weeds and habitat distruction. Limiting OHV use to designated roads reduces the risk of nest destruction for ground nesting species, reduces the risk of noxious weed spread, increases habitat security, and limits the extent of habitat that can be accessed in all Priority Communities.

"Almost without exception, analyses of the data reveal that Off Road Vehicle (ORV) use has significant negative impacts and can reduce numbers, diversity and biomass of vertebrates." (Berry 1980, Pg. 451).

Figure 4 –14 graphically depicts the difference between Alternatives by OHV allocation. Figure 4-14 shows that the action alternatives significantly reduce the amount of area where off road vehicle use is permitted, thus increasing habitat security. The amount of area designated as limited triples in the action alternatives. This will help isolate impacts of vehicles to defined area sand allow for greater habitat security in the remaining areas. There is also a slight increase in the amount of area closed to motorized vehicle use in the action alternatives. In general the action alternatives reduce the amount of Open designation while increasing the amount of Limited and to a lesser extent Closed designations.

Figure 4-14 . Acreages and Percentages of BLM Lands Designated as Open, Limited, and Closed to OHV use by Alternative

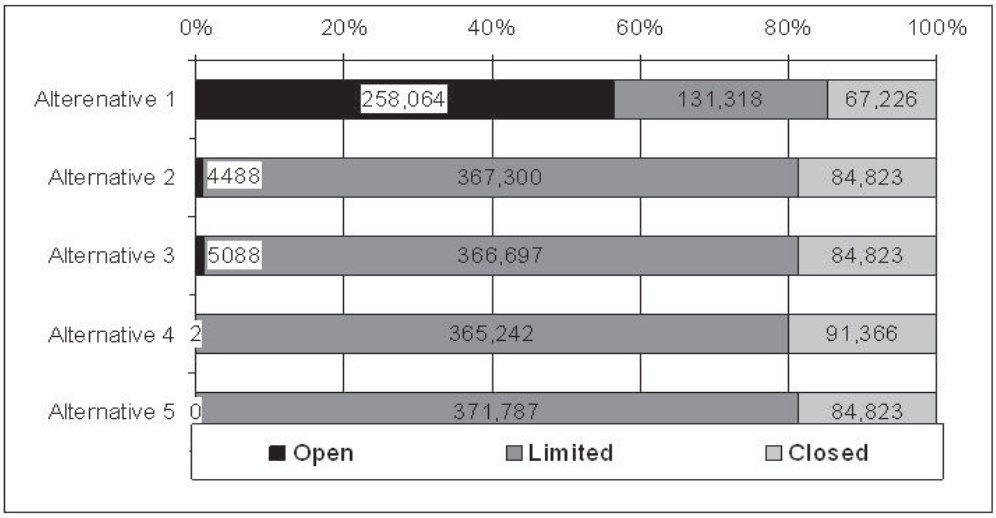


Figure 4-15 and Figure 4-16 (the action alternatives) display the amount of area in each OHV designation by key wildlife habitat. Alternative 1 would continue existing levels of OHV disturbance, habitat destruction of key wildlife habitats, and spread of noxious weeds. The action alternatives would reduce these effects commensurate with changing 90% of the area from open to limited to off road vehicle use.

Figure 4-15. Alternative 1 – Percentage of Key Wildlife Habitats on BLM Lands by OHV Designation

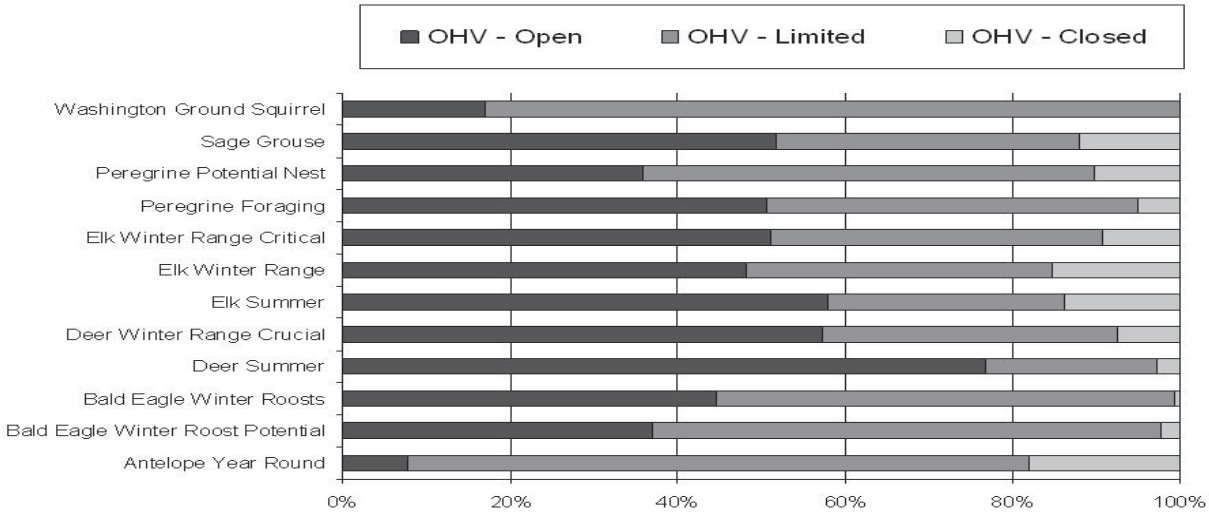
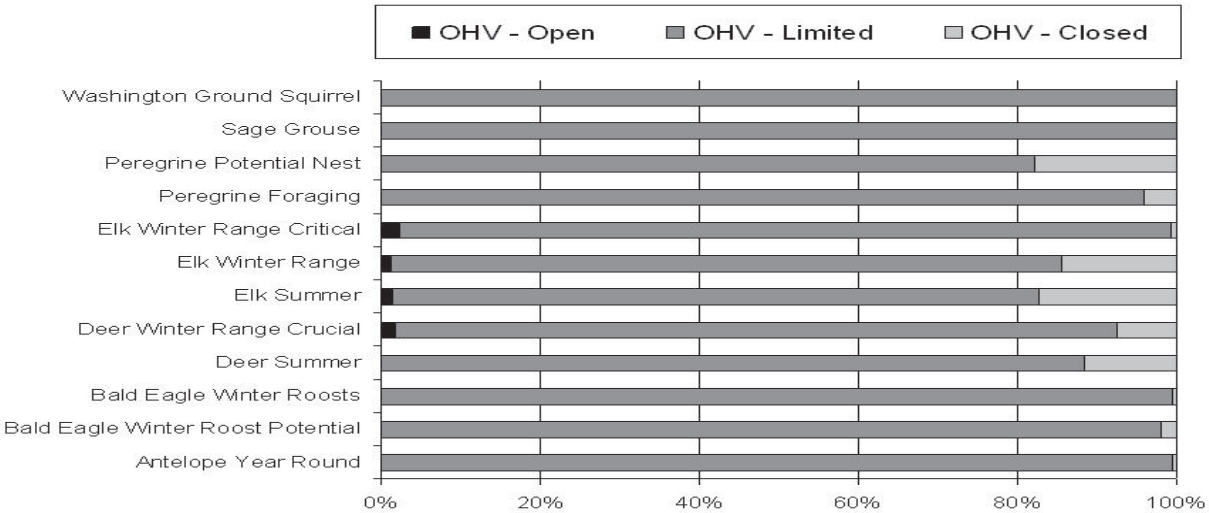


Figure 4-16. Alternatives 2, 3, 4, and 5* – Percentage of Key Wildlife Habitats on BLM Lands by OHV Designation



* Alternatives 2, 3, 4, and 5 varied by less than 5,000 acres, so the results of 2 and 3 are displayed here. The primary difference being that open acres in Alternatives 2 and 3 are closed and Limited in Alternatives 4 and 5, respectively, with the exception of 2 acres in deer summer range.

Wildlife disturbance from OHVs on wintering habitats can increase an animal's energy expenditure and result in mortality. OHV use in the spring on grassland and shrubland habitats has the potential to destroy nests of ground nesting birds like sage sparrow and sage grouse. As Figure 4-15 shows, Alternative 1 would allow off road travel on approximately 50% of most key wildlife habitats. The action alternatives designate open areas only in elk winter critical, elk winter, elk summer, and deer winter crucial, each with 2% or less of the total area in this category.

Under Alternative 2, triggers on Rudio Mountain that would determine when the designation would need to be shifted from Open to Limited for resource concerns would prevent sensitive species from becoming listed and ensure OHV disturbance of elk does not cause an 'undesirable' distribution in their winter use patterns as a result of the Open OHV designation. If a Limited to designated routes OHV designation is triggered, it would reduce the risk of nest destruction for ground nesting species, reduce the risk of noxious weed spread, increase habitat security, and limit the extent of habitat that can be accessed in the shrub and forest Priority Community.

Priority Communities

In Alternative 1, open OHV areas are dispersed across all Priority Communities. In Alternatives 2 and 3, open OHV areas are in the shrubland community and adjacent to forest. The open OHV area on Rudio Mountain is used extensively by a herd of antelope and is within ¾ miles of a golden eagle nest. The golden eagle nest is outside of any noise disturbance range. Depending on OHV use levels, the antelope herd will likely be displaced for portions of the day or year. Alternative 3 would have 1 additional Open OHV area approximately 600 acres in size in a shrub community outside of Mitchell. Alternatives 4 and 5 would designate approximately 5,000 acres less open OHV area than Alternative 2 and 3.

Sound from human activities, such as OHV use, can alter wildlife behavior and habitat use. Wildlife can also abandon favored habitat in response to sound disturbances, or incur energy expenses by reacting repeatedly when they cannot escape. Aversive levels of sound might cause wild animals to become irritable, affecting feed intake, social interactions, or parenting. All these effects might eventually result in population declines (Knight and Gutzwiller 1995). However, the type and amount of impact is highly variable based on the species, human activity associated with the habitat, and frequency, intensity, and randomness of the noise. In some cases, animals often learn to ignore disturbances that are not directed at them, and most animals seem to tolerate disturbance better in woodland than in open terrain (Knight and Gutzwiller 1995).

Habitat use by local wildlife on or adjacent to Little Canyon Mountain has likely been altered due to sound associated with OHV use. Alternative 1 allows OHV use across the area with no restrictions on the timing, intensity, or location of use. It is expected that species like deer avoid areas where chance encounters are most likely, but continue to utilize the general area. Other species like elk likely avoid the area due in part to the human activity (including OHV use) but to a larger extent the adjacency of human residences. The action alternatives would direct recreational use to specific areas and times, which would limit the amount of area impacted and make it much easier for animals to habituate. The Little Canyon Mountain area is not currently identified as part of a reproductive home range for any Threatened, Endangered, or Sensitive species. The noise levels from prescribed OHV use under any of the alternatives does not combine with disturbance from adjacent communities to have a measurable impact on Threatened, Endangered, or Sensitive wildlife species.

Summary of Travel Management and OHV Effects on Wildlife

Alternative 1 would have the greatest levels of disturbance to wildlife from noise, greatest loss of wildlife forage, and greatest loss of quality wildlife habitat. This would be due to the higher interim road densities, lower amounts of area closed seasonally, the lack of upper road density or specific direction for road locations as they relate to wildlife habitats, and the high amount of OHV Open designation. These effects vary extensively across all key habitats and Priority Communities.

Alternative 3 would have the next greatest level of disturbance to wildlife from noise, greatest loss of wildlife forage, and greatest loss of quality wildlife habitat. This is particularly true in the North Fork area. Opening existing road closures in the North Fork area would increase the potential disturbance to big game (including big horn sheep) and increase the potential for snag habitat lost to wood cutting in a key habitat area for Lewis' woodpecker. Alternative 3 would also have the highest Open OHV designation of all of the action alternatives, including approximately 598 acres outside of Mitchell that once supported a large wintering population of deer. Alternative 4 has the least impact to wildlife and wildlife habitats. The interim road designations in Alternatives 2, 4, and 5 are basically the same. Alternatives 4 and 5 have approximately 5,000 and 4,500 acres less in Open OHV designation than Alternative 3 and Alternative 2, respectively.

Other direction that would influence the travel management effects on wildlife:

Cover

Vegetative cover adjacent to roads can reduce the effects of the road for some species and increase habitat security. For example:

- Unsworth, *et al.* 1998 found that elk in areas with roads used habitats with greater canopy cover.

- 1 In the winter, elk in unroaded habitats increase use of open forest types. Roads through forage areas could reduce elk use of open forest by up to 90% for 500 m when hiding cover is unavailable (Lyon 1980, cited in Buckmaster 1999).
- 1 When roadside hiding cover is present, the road's zone of influence may be reduced to approximately 100 m (Buckmaster 1999).

All alternatives provide direction for the retention of cover; however, the action alternatives include guidance to specifically target cover retention within 550 yards of open roads. The action alternatives have higher amounts of land designated as Wildland Urban Interface (WUI). Areas within WUI and adjacent to primary roads will likely have reduced cover quantities directly adjacent to the roads to meet public safety requirements. Cover adjacent to those roads may be less in the action alternatives than Alternative 1.

Road Placement and Road Closure Prioritization Criteria

Alternative 1 would not provide substantive direction for road location or prioritization for closure of roads to avoid important wildlife habitats. The action alternatives provide direction to avoid placement of new roads and close of existing roads in or within the influence of secure habitat (1,182 yards) and riparian communities, as well as numerous Best Management Practices (BMPs) (Appendix B).

The level of risk to special status species or habitat is generally the same for Alternatives 2, 4, and 5 with the effects slightly reducing, respectively. Alternative 3 also has a more extensive interim road network on the North Fork area. Many of the roads in Alternatives 2, 4, and 5 that were not identified as interim routes were excluded because they were in or adjacent to key wildlife habitats. Therefore, Alternative 3 has higher potential for impacts to the Lewis' woodpecker, bald eagle, peregrine falcon, and Columbia spotted frog than all other action alternatives. Alternative 1 would have the greatest risk of impacting special status species because new routes could be user-created across the vast areas with Open OHV designation. All alternatives would require changes to travel management if special status species or habitats were identified as being significantly impacted by the travel management system.

Effects of Recreation on Wildlife

The effects of OHV designations have been addressed above in transportation effects section. The discussion below summarizes the effects of developed recreation sites.

Generally, developed recreation is intended to reallocate dispersed recreation use on to defined sites. All alternatives propose construction of a developed recreation site on the South Fork if negative effects of dispersed recreational use in this area become too great. Recreational development on the South Fork would occur across eight acres including each of the following habitat types: sage grouse habitat, critical elk winter range, elk summer range, bald eagle winter roosting area, and deer crucial winter range. The action alternatives propose construction of two developed recreation sites on the North Fork. These sites will be located across 28 acres including each of the following habitat types: bald eagle winter roosting area, deer crucial winter range, elk winter range, and elk summer range.

Alternative 1 will have the least wildlife habitat loss and fragmentation from recreational development because the facilities on the North Fork would not be constructed. However, higher levels of dispersed use would occur across the area. If the South Fork Campground were constructed the campground location would be adjacent to the South Fork road which is a major road; hence, habitat loss and fragmentation have already occurred. The effect of losing eight acres of habitat is less than the potential effects of increased use in the area due to the development. Risks include wildlife disturbance, increased vehicle-wildlife collisions on the South Fork road, and increased noxious weed spread. Alternative 1 would not cause a trend toward federal listing of any of the special status species.

The action alternatives would have the greatest recreation development impact due to the creation of developed sites on the South Fork and North Fork. Impacts common to all alternatives are described in Alternative 1. The creation of two developed campgrounds along the North Fork would increase the number of summer and fall hunting season user days. The seasonal closure on the camp grounds would protect bald eagle winter roosting

and big game winter ranges. The majority of recreational use would be expected along the river increasing disturbance to waterfowl. During the summer, there is extensive summer range for deer and elk higher in the watershed and on adjacent Forest Service lands. Therefore, BLM recreation management would not limit deer and elk habitat.

Effects of Land Tenure on Wildlife

Under all alternatives, land tenure classifications would generally not directly affect species and habitats. However, the actual land exchanges, acquisitions, and disposals would add or remove habitat from BLM jurisdiction. Wildlife guidelines in all action alternatives call for retaining high value wildlife habitats or exchanging them for lands with similar or greater value. There is the potential that other resource values would benefit at the expense of wildlife habitat values. It is impossible to predict how much of this may occur: effects to wildlife would be evaluated during implementation on a site specific basis. The only applicable measure is the types of zoning by key wildlife habitat as an indication of potential. Figure 4-17 displays how the action alternatives designate more Z1 (retain in public ownership lands with high public value) and Z3 (sell or exchange them for lands with higher public value) than Alternative 1. The action alternatives would retain a greater percentage of key wildlife habitats, but would also designate approximately 10% more key habitats as Z3 than Alternative 1. These lands are mostly scattered tracts that are more difficult to manage. Without site specific survey, it is impossible to say if there are important wildlife structures or habitat on these parcels. Actual land exchange and disposal proposals will be analyzed through the appropriate NEPA processes on a case-by-case basis.

Figure 4-17. Percentage of Key Wildlife Habitats on BLM Land by Land Tenure and Alternative

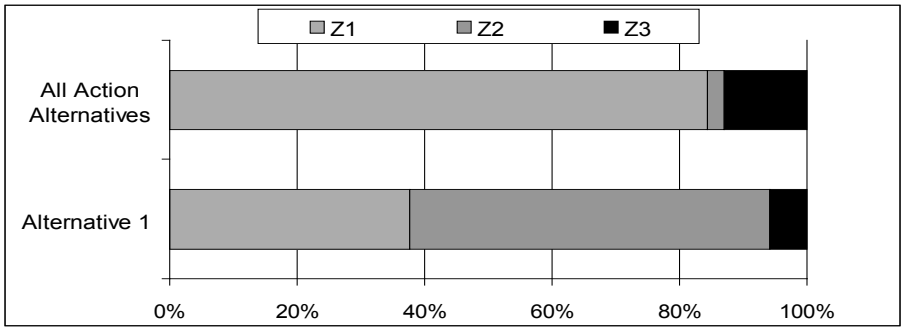


Table 4-16 shows the variation in land tenure zoning by alternative and Key Habitat type. The action alternatives increase the amount of Z1 in each of the key wildlife habitats. Disposal of key habitats is a concern especially if those habitats are limited. The action alternatives propose increases in Z3 on the following percent of the total habitat type on BLM lands in the plan area: sage grouse (≈6%), bald eagle winter roost (≈3.5%), elk winter (≈11.5%), and elk critical winter range (≈5.4%). Considering all zoning allocations, the action alternatives assume less risk of habitat loss than Alternative 1 due to the greater amount of lands zoned for retention.

Reasonably foreseeable realty actions include several proposals for legislated land exchanges around Rudio Mountain and other areas. These land exchanges generally follow the direction and objectives of the Lands and Realty Objectives with a few exceptions, such as zoning. Based on a brief review of currently proposed tracts the following changes of habitat management are likely:

- 1 The loss of medium potential peregrine cliff habitat would be countered with blocking up two peregrine cliff habitat sites and surrounding them with BLM land.
- 1 Acquisition of lands adjacent to Open areas may improve enforcement and compliance in those areas.
- 1 In other areas, acquired lands would be adjacent to wildlife habitat already designated as Limited for OHVs. Total amounts of wintering habitats exchanged would be similar; however, the exchange would block up habitats and make it easier to implement seasonal closures and habitat restoration projects.

Table 4-16. Acres of Key Wildlife Habitats on BLM Lands by Land Tenure and Alternative

Key Habitat	Alternative 1			Alternative 2 - 5		
	Z1	Z2	Z3	Z1	Z2	Z3
Antelope Year Round	2,472	10,829	408	13,217	0	492
Bald Eagle Winter Roost	1,345	5,664	0	15,227	0	0
Bald Eagle Winter Roost Potential	7,326	7,904	0	6,802	23	180
Deer Summer	5,772	27,091	1,682	17,603	6,297	10,697
Deer Winter Range Crucial	97,521	135,605	21,894	223,502	3,949	27,281
Elk Summer	167,714	150,162	30,421	272,684	17,810	57,734
Elk Winter Range	76,768	124,601	7,553	177,122	0	31,516
Elk Winter Range Critical	26,095	83,559	119	103,436	0	6,057
Peregrine Foraging	419	2,067	0	2,486	0	0
Perigrine Potential Nest	1,932	1,011	181	3,036	0	87
Sage Grouse	6,948	51,107	0	54,509	0	3,531
Washington Ground Squirrel	6,061	0	240	6,329	0	0

Effects of Minerals and Energy Development Rights of Way on Wildlife

The development potential of mineral and energy resources changes through time as the technologies that allow for their extraction change. Effects to wildlife habitat or use can be short term and localized (e.g., infrequently removing material from a pit outside of critical periods), or long term and extensive in scope (installing a power or telephone line that increase the amount of raptor/corvid predation on ground nesting birds or small mammals). Because there are no specific actions being evaluated at this time, the indicator of effects between alternatives is the level and type of protection provided to wildlife or wildlife habitats.

Alternative 1 currently has limited guidance for wildlife protection from minerals, energy, and other development than general objectives about not causing a trend toward federal listing. The action alternatives provide specific direction that restricts timing and location around important wildlife or habitat features (see Wildlife, Chapter 2). The action alternatives provide increased protection for big game security habitat, cave/bat habitat, and sage-grouse leks. They also increase the protection for Washington ground squirrels through designation of the Four mile tract as an ACEC. The protection of 11,929 acres of BLM lands with Wilderness Characteristics in the action alternatives would also limit surface occupancy and thus reduce the risk of disturbance in wildlife habitat.

There are less than 2,300 acres of moderate to high potential wind energy locations in the plan area. The action alternatives preclude wind energy development on approximately 200 more of these acres than Alternative 1. Bat fatalities associated with wind farms have been documented around the world. It is not known at this time if any of the moderate to high potential sites are within bat movement corridors. Site specific analysis for each proposal would be reviewed prior to approval of any Right of Way (ROW) or wind tower. Alternative 1 would have slightly more risk of having wind tower or ROW proposals that would result in actions that intersect bat movement corridors.

Effects of Agricultural Leases on Wildlife

There are three categories of agricultural leases: restoration of floodplains, wildlife food and cover plots, and commercial leases to farmers.

Restoring floodplains (including the Inter-Mountain Basins Montane Riparian Systems, Rocky Mountain Montane Riparian, and Riparian BpSs) would improve cottonwood potential within these riparian areas. As cottonwood increased, so would yellow billed cuckoo habitat potential. Even with high vegetation growth rates, it's not expected that habitat would substantially increase for more than 20 years.

Wildlife food and cover plots provide higher levels of forage and cover for locally important upland game birds, stop over food sources for some migratory birds, higher concentrations of prey for predators such as hawks, and winter food sources for big game. Managing these areas in food and cover plots increases the number of individuals and diversity of wildlife that utilize these sites. Food and cover plots can also keep wintering wildlife on public lands during the winter, thus reducing conflicts on surrounding private lands.

Commercial agricultural leases provide increased levels of forage, but due to the nature of the crops (generally hay or alfalfa) it is more advantageous to meadow nesting birds and big game. Because the BLM would not control the type of crop, its value to meadow nesting birds may vary from year to year. If maintained in grass hay with haying delayed until later in the summer, these sites could provide nesting opportunities for species like bobolinks.

Alternative 1 proposes to restore 500 acres and allow 180 acres of commercial or wildlife food and cover. The commercial and wildlife food and cover would be within the currently allocated agricultural lease. Of the 180 acres, commercial use would take precedence over wildlife food and cover if demand exists. Based on current demand approximately 50% is in commercial use. The current use of 180 acres amounts to approximately 0.33% of the relevant riparian habitats on BLM lands in the plan area.

The action alternatives propose to restore 400+ acres and would allow up to 400 acres of commercial or wildlife food and cover at any one time within the identified 1,200 acres potential. Commercial uses would not take precedence over wildlife food and cover; rather, the decision would be made on a case by case basis. For purposes of analysis it is assumed 200 acres would be managed in commercial and wildlife food and cover (based on current demand percentages). These acres would be distributed across more of the plan area than Alternative 1, which would increase their juxtaposition to a greater diversity of surrounding habitats. This increased diversity and increased acres under the action alternatives would benefit a greater variety of wildlife species when maintained in an agricultural lease. There is also increased risk under the action alternatives of noxious weed and non-native invasion and expansion due to increased disturbance in these areas (i.e. plowing, seeding, haying equipment, increased hunter use, rehabilitation failure).

Summary of Effects of Actions on Priority Community and Threatened, Endangered, and Sensitive Wildlife Species

There are 31 Sensitive species documented or suspected in the plan area and no known Threatened or Endangered wildlife species. Impacts associated with the following actions will have the greatest impact to Threatened, Endangered, and Sensitive species: travel management direction and interim road densities, OHV designations, and vegetative treatment types and locations.

Alternative 1 accepts the greatest risk that impacts from motorized use (especially off road) and vegetation changes would cause a trend toward federal listing before monitoring data would suggest a needed change in management. The action alternatives would assume less of a risk that a species habitat or population would be threatened due to actions associated with these alternatives. The reduced risk in the action alternatives is due to the combination of vegetative communities being managed for a variety of habitat components consistent with site potential and disturbance, reduced levels of off road motorized use, and criteria to direct transportation planning to protect sensitive populations and habitats. Interim road densities in Alternatives 2, 4, and 5 also assume less risk to populations by limiting the scope of motorized access to wildlife habitats until a transportation plan is written.

All alternatives require that a site specific analysis of impact be completed prior to implementation of habitat altering projects. Actions associated with all alternatives are not expected to cause a trend toward federal listing of any wildlife species in the plan area.

Special Status Amphibians

Effects of Special Designations on Special Status Amphibians

Under Alternatives 2 through 5, there exist greater land protections in the form of ACECs, RNAs and areas managed for Wilderness Characteristics, which could provide greater protection to the Columbia spotted frog than under Alternative 1.

Effects of Livestock Grazing on Special Status Amphibians

Grazing in Columbia spotted frog habitat in the early spring between the end of March and the beginning of June could have an adverse effect on breeding. Eggs are laid in shallow pools and sloughs and may be trampled by watering cattle. Light to moderate grazing outside of the breeding season would not always be detrimental to spotted frogs. This species only thrives in low vegetation; it often disappears when the vegetation becomes too high and dense. Where vegetation is naturally low, grazing may reduce populations if grazing removes too much of the sedge/rush plant community. This leaves the frogs open to predation by great blue herons and garter snakes. The alternatives do not differ in proposed direction for season of use, so there would be negligible differences in their effects on spotted frog habitats and populations. Maintaining stubble height above 6 inches in riparian areas could mitigate adverse effects.

Effects of Noxious Weed Management on Special Status Amphibians

Since the management of noxious weeds will feature essentially the same management approach for all alternatives, effects of noxious weed management on the Columbia spotted frog will be similar between alternatives. The removal of noxious weeds by means other than spraying would be more beneficial to the species.

Special Status Mollusks

Fire Management Effects on Special Status Mollusks

Deixis consultants could not find any live Dalles mountain snails in the Biggs area in 1995. They believe that the snail could have been eliminated by wildfires that occurred in the area in 1994. It is likely that any widespread burning of the habitat, either wildfire or prescribed fire could reduce populations of the snail. This would be true for all alternatives. The greater number of acres of prescribed fire and Appropriate Management Response under Alternatives 2-5 may cause greater reductions in populations than Alternative 1, depending on fire locations. Following BMPs for sensitive species during project planning and implementation would mitigate any adverse effects under all alternatives.

Aquatic Habitat Management Effects on Special Status Mollusks

Under alternatives 2 through 4 additional protections would be available to springs associated with talus habitat where the Dalles mountainsnail is found relative to Alternative 1.

Livestock Grazing Effects on Special Status Mollusks

Terrestrial snails are vulnerable to intensive grazing since they occupy the soil surface and are easily crushed by the hooves of cattle, sheep, or horses as well as those of native ungulates. Frest and Johannes consider grazing as a threat to the Dalles mountain snail and state that the species is absent from heavily grazed area. Since the species is found in talus piles, exposure to hooves would be limited except where there was an associated spring that could attract livestock. Native ungulates would not be a problem unless populations were unusually high. The threat could occur under any of the alternatives, but would likely be greater under Alternative 1 since this alternative has the potential for fewer grazing allotment closures to authorized grazing use than the action alternatives.

OHV Use Effects on Special Status Mollusks

There are no specific rules that would protect the Dalles mountainsnail under any of the alternatives. Since there are no known populations of the Dalles mountainsnail in the plan area at present, it is difficult to say whether or not there would be an impact. The snails are found in locations that would not often be used by OHVs unless they were rock climbing on the talus slopes. Limitations of OHV use largely to designated roads and trails under Alternatives 2-5 would reduce the likelihood of an adverse effect on the Dalles mountainsnail relative to Alternative 1.

Recreation Effects on Special Status Mollusks

Recreational activities under all alternatives such as hiking and camping would have negligible effects on the Dalles mountainsnail.

Vegetation Management Effects on Special Status Mollusks

There would be little effect from terrestrial vegetation management on the Dalles mountainsnail. The locations in which these snails are found are not usually densely vegetated and would not normally need to be treated for high fuels build-up.

Noxious Weed Management Effects on Special Status Mollusks

Frest and Johannes do not expressly list weed management as a threat for the Dalles mountainsnail, however they do not consider herbicide spraying as a threat for many other terrestrial species. It is likely that they considered the Dalles mountainsnail to be found in mostly weed free areas, and therefore safe from that threat. Where the species is found without an associated spring, spraying of infestions such as knapweeds or dalmation toadflax may result in an adverse impact under all of the alternatives.

Mineral Development Effects on Special Status Mollusks

The use of talus as fill or to produce gravel would eliminate populations of the Dalles mountainsnail associated with the resource at that location. Frest and Johannes found that many populations of snails in the Columbia Gorge were decimated as talus was used in the construction of dams and railroads.

Wild Horses

Introduction

Analysis of the environmental consequences of the alternatives on wild horses considered the following key resources or resource uses: Vegetation Management, Livestock Grazing (water development), and Recreation.

Indicators used to compare environmental consequences between alternatives include wild horse habitat quality.

Wild Horses on the Murderers Creek Wild Horse Management Area will be managed the same in all alternatives. The Management Plan for the HMA has recently been revised (10/2007) and will guide BLM management activities.

Alternatives 2-5, which contemplate increased acreages of tree thinning would provide increased forage for wild horses. Habitat would also be improved to a greater extent by fuels treatments under Alternatives 2-5 than Alternative 1.

Additional water developments will benefit wild horse habitat. Since Alternatives 2-5 propose a greater number of allotment closures than Alternative 1, they may not result in as many new water developments.

Under all alternatives increased, levels of recreational activities such as increased OHV use in the Murderers Creek HMA will increase harassment of wild horses and may render some habitat unavailable to wild horses, at least seasonally.

Wilderness Characteristics

Introduction

Managing certain lands outside of WSAs to protect their Wilderness Characteristics will protect their natural condition and provide opportunities for solitude or primitive and unconfined recreation.

Analysis of the environmental consequences of the alternatives on areas with Wilderness Characteristics considered the following key resources or resource uses: Fuels, Fire Management, Wildlife, Visual Resources, Livestock Grazing, Recreation Opportunities, Travel Management, Energy and Mineral Resources, Lands and Realty.

Indicators used to compare environmental consequences between alternatives include: Number of acres to be managed to protect wilderness character.

Wilderness Characteristics Assumptions

- Managing lands with wilderness characteristics under VRM Class II will provide a balance between protecting visual resources and allowing some fuel treatments to occur including limited mechanical treatment of juniper and thinning of diseased forests and woodlands.
- Lands managed for wilderness characteristics would be closed to commercial permits for forest products.
- Proposed projects and uses such as fuels treatments, noxious weed control, riparian or wildlife habitat improvements, wild horse management, livestock improvements and commercial recreation would be evaluated on a case-by-case basis to ensure that any reductions in Wilderness Characteristics are temporary, and Wilderness Characteristics are protected over the long term.

The following resources or resource uses will have no substantive effects at the planning scale on Wilderness Characteristics: Soils, Air Quality, and Native American Uses. No known aquatic resources projects are proposed for lands considered for protection of Wilderness Characteristics. There are no known BLM lands managed for agriculture or significant Cave Resources that overlap lands considered for protection of Wilderness Characteristics. None of the existing or proposed Areas of Critical Environmental Concern or Research Natural Areas (ACEC/RNA) overlap the lands considered for protection of Wilderness Characteristics.

Analysis of the Effects of the Alternatives on Wilderness Characteristics

Vegetation Management Effects on Wilderness Characteristics

Continuing existing management in Alternative 1 would allow vegetative treatments on these lands to continue within existing restrictions. In all action alternatives, limited mechanical treatment of juniper and thinning of diseased timber would be allowed if consistent with VRM Class II guidelines and necessary to protect Wilderness Characteristics. Proposed vegetation treatments would be evaluated on a case-by-case basis to ensure that any reductions in Wilderness Characteristics are temporary, and Wilderness Characteristics are protected over the long term. Special Status Plants would be protected and noxious weed control would be permitted regardless of the alternative selected.

Fire and Fuels Management Effects on Wilderness Characteristics

Under Alternative 1, all wildfires are suppressed and there is no direction of use of AMR. Actions such as mechanical treatment or uncharacteristic wildfire alter the vegetation and change the landscape's texture, color, and pattern. Full suppression frequently alters the landscape and increases accessibility with construction of routes and travel with mechanized equipment. As the landscape is altered and access increases, naturalness and solitude would be reduced.

Managing fire within the full range of AMR under Alternatives 2-5 would move the landscape vegetation toward attainment of natural fire regimes. Use of fire to restore the vegetation translates into less mechanical disturbance of the vegetation. When using fire under AMR, minimum impact management tactics would be

used and a Resource Advisor would bring forward concerns specific to protecting Wilderness Characteristics. In combination, the restoration of natural fire regimes, the reduction of mechanical disturbances, and the use of a Resource Advisor would all promote naturalness.

Wildlife Management Effects on Wilderness Characteristics

Greater seasonal area closures for motorized vehicles as proposed in Alternatives 2 and 3 would have very little effect compared to current management (Alternative 1) or the other action alternatives on lands managed to protect Wilderness Characteristics, as there are currently very few routes open to motorized use. Current winter use of these routes is minimal, and some of the winter activities are illegal in nature, including unauthorized wood cutting and access for unauthorized cross-country vehicle use associated with horn hunting. Closing the designated routes to motorized use during winter months may help cut down on illegal activities, requiring all users to travel by foot, horse, or boat during the winter season. If the illegal activities on these few designated routes continue in areas managed for wilderness characteristics under Alternatives 2-5, they may be closed to motorized use year round.

Wild Horse Management Effects on Wilderness Characteristics

Under all alternatives, proposed wild horse management projects would be evaluated on a case-by-case basis under the action alternatives, these evaluations would ensure that any reductions in Wilderness Characteristics are temporary, and Wilderness Characteristics are protected over the long term.

Visual Resources Management Effects on Wilderness Characteristics

Alternative 1 does not propose protecting areas with wilderness characteristics. Designating lands managed for wilderness characteristics as VRM Class II under the action alternatives would help retain the characteristic landscape and provide a balance between protecting visual resources and allowing some fuel treatments to occur including limited mechanical treatment of juniper and thinning of diseased timber. Under Alternative 1, these areas would be managed like similar and adjacent lands and would not necessarily retain characteristic landscape qualities.

Special Designations Management Effects on Wilderness Characteristics

Management of designated Wild and Scenic Rivers and WSAs would continue as under current management, and would not differ in effects between alternatives. Under the action alternatives, protective management of Wilderness Characteristic units which are located adjacent to WSAs may offer some additional protection to these WSAs in some cases, such as reduced incidence of unauthorized motorized vehicle use and reduced visual affects from adjacent energy, mineral, or facility developments. There are no eligible or suitable Wild and Scenic Rivers overlapping lands considered for protection of Wilderness Characteristics.

Paleontological Resource Management Effects on Wilderness Characteristics

Under all alternatives proposed paleontological resource projects such as excavations would be evaluated on a case-by-case basis under the action alternatives, these evaluations would ensure that any reductions in Wilderness Characteristics are temporary, and Wilderness Characteristics are protected over the long term.

Cultural Resource Management Effects on Wilderness Characteristics

Under all alternatives proposed cultural resource projects such as excavations would be evaluated on a case-by-case basis under the action alternatives, these evaluations would ensure that any reductions in Wilderness Characteristics are temporary, and Wilderness Characteristics are protected over the long term.

Livestock Grazing Effects on Wilderness Characteristics

Livestock grazing in areas with wilderness characteristics would continue as under current management and would generally not differ in effects between alternatives. Under all alternatives, proposed livestock developments would be evaluated on a case-by-case basis. Under the action alternatives, these evaluations would

ensure that any reductions in Wilderness Characteristics are temporary, and Wilderness Characteristics are protected over the long term. New livestock developments could reduce naturalness or opportunities for solitude.

Recreation Management Effects on Wilderness Characteristics

Special Recreation Management Areas (SRMA)

Existing management goals identified for the John Day River SRMA and continued in Alternative 1, and management goals identified for additional SRMAs in Alternatives 2-5, including recreation management zones, would be consistent with protecting Wilderness Characteristics. No differences in effects are anticipated between alternatives as a result of SRMA allocations.

Facilities

Lands with Wilderness Characteristics would be closed to construction of new buildings under Alternatives 2-5, but would be open to new construction under Alternative 1, with the possibility of adversely affecting their wilderness quality.

OHV Management

Continuing existing management under Alternative 1 would continue current OHV restrictions, limiting vehicle use to signed designated routes for all of these lands except Big Canyon, which is currently open to cross-country vehicle use. In Alternatives 2-5, limiting OHV use to signed designated routes on all lands managed to protect Wilderness Characteristics would help prevent new unauthorized routes from being created, reduce unauthorized cross-country vehicle use, and prevent the spread of noxious weeds.

Recreation Permits

Under all alternatives, proposed recreation permits would be evaluated on a case-by-case basis. Under the action alternatives, these evaluations would ensure that any reductions in Wilderness Characteristics are temporary, and Wilderness Characteristics are protected over the long term.

Travel Management Effects on Wilderness Characteristics

Lands with Wilderness Characteristics would not be affected by travel management decisions under any alternative as they contain no roads identified in the travel management system. Under Alternatives 2-5, areas managed for wilderness characteristics would be closed to construction of new temporary or permanent roads.

Energy and Mineral Resources Management Effects on Wilderness Characteristics

Continuing existing management under Alternative 1 would allow energy and mineral development of these lands to continue within existing restrictions on lands with wilderness characteristics. In Alternatives 2-5, managing these lands as available for mining operations (provided that the proposed use would not impair wilderness characteristics), and under no-surface-occupancy requirements for fluid mineral development and closing them to wind development would better protect their Wilderness Characteristics.

Lands and Realty Management Effects on Wilderness Characteristics

Land Tenure

Existing land tenure decisions under Alternative 1 are not consistent with the proposed protection of Wilderness Characteristics under Alternatives 2-5. Twenty-eight percent of the lands with wilderness characteristics are identified as suitable for disposal under Alternative 1. Of the 11,929 acres identified for management to protect Wilderness Characteristics under the action alternatives, 2,192 acres are currently identified to be retained in Federal ownership (Z-1), 6,082 acres are suitable for retention but could be traded for lands with higher resource values (Z-2), and 3,656 acres are suitable for disposal (Z-3). In Alternatives 2-5, identifying all 11,929 acres of these lands for retention in Federal ownership (Z-1) would be required in order to manage these lands to protect their Wilderness Characteristics.

Use Authorizations

Continuing existing management under Alternative 1 would allow rights-of-way (ROWs) to be issued on lands with wilderness characteristics within existing restrictions. Identifying these lands as ROW exclusion areas in Alternatives 2-5 would help to protect their Wilderness Characteristics by reducing new development.

General Effects on Lands with Wilderness Characteristics Not Offered Special Protections

Under all alternatives, approximately 2,371 acres of lands found by BLM to contain wilderness characteristics would be offered no new protections and wilderness characteristics would not necessarily be retained. BLM would continue to manage these lands the same as similar and adjacent lands. Lack of direction to protect areas with wilderness characteristics would allow actions such as mechanical vegetation treatment, and route and facility construction. As examples, large scale mechanical treatment of juniper or forest stands may result in large clearings containing tree stumps, making man's influence clearly visible. Permitting new right-of-way authorizations, allowing oil and gas leasing, and allowing wind development could result in new roads, new utility lines and increase noise from motorized activity. These highly visible and audible uses would reduce the natural character of the landscape and reduce the opportunity to experience solitude.

Cave Resources

Alternative 1 provides less protection to cave resources, and could result in greater disturbance of significant cave resources than the action alternatives. Since cave management direction is lacking in existing RMPs for the plan area, caves would continue to be managed in accordance with the BLM national and Oregon/Washington Cave Management Policy. These policies would serve to protect known cave resources in general, but do not specifically restrict adjacent habitat disturbing activities.

The action alternatives provide specific management direction to identify, protect and enhance cave resources on public lands, including development of a cave management plan for Wild Horse Point Cave. In addition, the action alternatives would limit management disturbance within 350 feet of any cave on public land, potentially restricting uses on nine acres. Areas within 440 yards (1/4 mile) of any cave would be rights-of-way avoidance areas (see Lands and Realty section of this chapter). The 350 feet and 440 yard perimeter restrictions around any known cave under the action alternatives would reduce the potential for surface disturbance from management activities more than Alternative 1.

Visual Resources

Introduction

Analysis of the environmental consequences of the alternatives on visual resources considered the following key resources or resource uses: Air Quality, Vegetation Management, Aquatic Resources, Fire and Fuels Management, Wildlife, Visual Resource Management, Recreation, Travel Management, Energy and Minerals, and Lands.

Indicators used to compare environmental consequences between alternatives include: visual quality and acres of VRM Management Class I through IV.

Except for recently acquired and previously existing contiguous public lands in the North Fork of the John Day River, BLM used the existing VRM Inventory Classes from the Two Rivers, John Day and Baker RMPs to determine final VRM Classes for public lands across the John Day Basin plan area. The allocation of VRM Classes by alternative is summarized in Table 4-9.

Visual Resource Assumptions

- 1 All activities would conform to each VRM Class, as proposed in each alternative.
- 1 There may be short and long term effects to visual quality, depending on the action or activity.
- 1 While VRM inventories may include all land jurisdictions and ownerships, BLM visual resource management decisions only apply to BLM lands.
- 1 No actions proposed in any alternative are expected to change a VRM class due to VRM Class objective constraints.

Analysis of the Effects of the Alternatives on Visual Resources

Visual resource impacts are largely evaluated on a project-specific basis by evaluating the degree of change, or contrast created within a characteristic landscape. Activities that result in the most contrast and are most noticeable to the public are considered to have the greatest affect on scenic quality. Most of the effects described in this section are expected to be implemented within the life of this plan, but are not specifically analyzed, or authorized, because visual contrast evaluations are required by BLM VRM policy and are more site-specific.

Effects on Visual Resources Common to All Alternatives

Air Quality

Compliance with air quality standards would continue to promote clear scenic views of public lands across all alternatives.

Alternative 1 Effects on Visual Resources

Vegetation Management Effects on Visual Resources

Under Alternative 1, impacts would occur mainly on public lands classified as VRM Class III and IV. No projects, or only minor projects that result in minor impacts would be allowed on public lands classified as VRM Classes I or II. Prescribed fire would be the primary treatment used in VRM Class I areas.

Vegetation removal, forest thinning, fire-killed vegetation and limited road construction would decreases visual quality in the short term. Surface disturbance and contrasts between treated and untreated landscapes would be less over the long term if VRM project objectives are followed. There would continue to be a higher potential of stand replacing wildfire in forestlands in the South and North Forks of the John Day River and in the Rudio Mountain area under Alternative 1 due to a lower level of proactive thinning.

Alternative 1 would result in a higher probability of adverse visual effects from uncharacteristic fire due to a smaller area of treatment proposed in these areas, compared to all of the action alternatives. Fewer long term benefits to visual quality in forestlands would occur and would contribute to a higher probability that landscape would burn with limited or no live vegetation remaining.

Visual effects from mechanical juniper treatments would be similar between alternatives due to the type of treatment methods used, but would vary according to the amount of treatment acreage occurring annually and over the life of this RMP. Mechanical juniper treatments would be less apparent in the mid and background of landscapes treated, but may leave short and long term effects on visual quality in the foreground near roads unless juniper and conifer tree stumps are cut flush with the ground. Treatments next to public and private land ownership boundaries would be designed to meander on public lands, to avoid straight line treatment contrasts.

The effects of rangeland drilling of crested wheatgrass on visual quality would create an unnatural appearance by creating “crop-like” rows of vegetation within a landscape. These effects would not differ between alternatives. The light gold color of crested wheatgrass would create visual contrasts in the landscape. Visual effects could be reduced if other native herbaceous species, shrubs and trees were planted at the same time.

Riparian and Aquatic Habitat Management Effects on Visual Resources

Rivers and creeks contain the most vegetative diversity of all habitat types, and flowing water enhances visual quality. Riparian and aquatic habitat actions that sustain, enhance, or protect watershed functions, fish habitat and water quality in these habitats, would also enhance visual quality.

VRM Class III classification, PACFISH and State Scenic Waterway regulations help protect and maintain existing visual quality of the John Day River and its tributaries. Under Alternative 1, retention of healthy riparian vegetation along rivers and creeks would enhance visual quality. However, Alternative 1 would not limit OHV use in riparian and aquatic habitat, resulting in effects to vegetation and bank stability, consequently lowering visual quality in the short and long term in areas where motorized use occurs.

Fuels and Fire Management Effects on Visual Resources

Similar effects on visual resources would occur under all alternatives from conducting treatments such as thinning and prescribed burns that remove vegetation in the wildland-urban interface. The amount of visual effect is dependent on the vegetative type, size of project area, project objectives, layout, treatment type and visual contrasts between treated and untreated landscapes.
This could result in major changes to the visual landscape by allowing prescribed fire to burn. However, visual resources would be protected in the long term by reducing the amount and severity of potentially uncontrolled wildfire by reducing high fuel loads.

Under Alternative 1, there would be less short-term visual effects from fuels management actions due to less acreage treated. However, since Alternative 1 provides direction to suppress all wildland fires and has no direction to use AMR, over the long-term visual quality would be expected to decrease due to increased potential for catastrophic wildfire events in the short and long-term.

Short-term impacts from fire suppression would be higher under Alternative 1 than the action alternatives due to its continuation of suppression of all wildland fire ignitions that leave untreated and unburned areas vulnerable to uncontrolled wildfire events.

Short-term adverse impacts from prescribed burns would have limited effects if mitigation measures are followed. Project layout design using VRM mitigation actions could reduce short term effects and may enhance visual quality over the long-term by creating vegetative mosaics and diversity across the landscape.

Rehabilitating landscapes damaged by wildfires under any alternative would help minimize the severity of wildfire impacts on visual resources in the long term. Short term effects may be apparent if burned landscapes are next to roads or areas seen by public land visitors the use of fire lines and retardant would cause noticeable changes to the “natural environment” which some visitors define as a conifer, or juniper covered landscape, without regard to their ecological condition.

Wildlife Management Effects on Visual Resources

Under Alternative 1, existing wildlife seasonal motorized recreation restrictions on 86,793 acres and road density limits may enhance visual quality indirectly, providing that motorized recreation users comply with these use restrictions.

Vegetation management to meet wildlife objectives may affect landscape aesthetics along improved roads through BLM public lands in areas with high visual sensitivity if vegetation canopy removed on a long-term basis. Vegetative diversity projects for wildlife management are expected to enhance visual quality in long term by increasing vegetative diversity in the landscape.

No other long-term beneficial effects to visual quality are anticipated from wildlife management. Affected landscapes are largely located away from areas frequently seen by public.

Special Designations Effects on Visual Resources

Under Alternative 1, the eight WSAs, totaling approximately 95,755 acres, would continue to be managed under VRM Class I, so the highest level of protection for existing visual qualities would continue to be maintained, until Congress acts on Wilderness designation, or releases these public lands for other uses. Alternative 1 provides a lower level of visual qualities than any of the action alternatives if these areas are released from further wilderness review by Congress.

Public lands with ACEC designations would also protect scenic quality by limiting uses that affect visual quality. Protective management of the North Fork John Day river segment found eligible or suitable for possible Wild and Scenic designation of public lands along the North Fork John Day River as a WSR by Congress would provide a higher level of protection of visual quality by managing this river to protect outstandingly remarkable scenic qualities in this river canyon.

Visual resources are already protected by existing federal WSR regulations on the main-stem John Day River, and South Fork John Day River. Existing State Scenic Waterway regulations for these rivers and the Middle and North Fork John Rivers also protect visual quality by limiting or prohibiting activities or actions that reduce visual quality within ¼ mile on each side of these rivers.

Visual Resources Management Effects on Visual Quality

Table 4-9 summarizes the area in each VRM Class across the plan area by alternative. Retention and enhancement of visual quality on public lands would continue to be governed by BLM VRM Class I-IV objectives. Visual quality may be enhanced, or decrease, depending on VRM Class, the location of public land, the size, number and type of projects developed within a landscape and visual mitigations.

Projects such as a juniper treatment, may result in short-term adverse effects, but may also have long-term enhancement of visual quality, depending on how successful VRM mitigation objectives were met. Long term benefits of this type of project on visual quality may result by creating vegetative diversity in the landscape and reduced potential for catastrophic wildfire.

Public lands classified as VRM Management Class I and II would continue to retain existing scenic quality in the short and long-term, because changes to the landscape would not be allowed, or apparent. Public lands with VRM I and II classifications would have the least potential for changes to visual quality.

Retention of existing scenic quality on public lands classified as VRM Management Class III or IV would be expected to change over the short and long term, having the greatest potential for changes to visual quality. Projects or actions on these lands could modify the landscape and would attract attention if seen. Public lands classified as VRM Class IV that are occupied by projects such as cell towers, wind turbines, and utility powerline towers and wires, would not revert back to a natural appearing landscape over the long term.

VRM Class II designation in Alternative 1 encompasses 101,987 acres, and does not include this level of visual protection for public lands in the North Fork John Day River Canyon, or in the Gilman Flat plateau area.

Recreation Management Effects on Visual Resources

Under the Alternative 1, visual effects would continue to increase from random OHV use, especially on public lands near residences. Alternative 1 designates 258,064 acres as Open to off road OHV use. Alternative 1 also has the least amount of acres seasonally closed to OHV use, so visual scars from OHV tracks would be expected on public lands near communities where OHV users live, and on public lands used for hunting and horn hunting by ATV users.

Under Alternative 1, approximately 57% of the plan area is designated open, allowing cross-country vehicular travel. Recreation visitors would continue to create new motorized routes and trails across the landscape, resulting in removal of vegetation and exposure of soils. These actions create short and long term visual scars that reduce visual quality on the landscape in the short and long-term.

These negative effects to visual quality would be greater under Alternative 1 than any of the action alternatives.

Energy and Mineral Resources Management Effects on Visual Resources

Any development of mineral materials, oil, gas, and geothermal leasing, locatable minerals and wind energy development has a high potential to change the natural character of the landscape. New structures, creation of new roads or upgrading existing roads, project operation including delivery of resources to market, would result in short and long-term impacts on visual quality.

Alternative 1 would provide more public land acreage where energy projects would be allowed, or would be limited in a manner that retains visual character, than any of the action Alternatives. VRM project mitigation measures would reduce the significance of effects, but developments would reduce visual quality of the landscape where projects are allowed.

Land Tenure, Realty and Use Authorization Effects on Visual Resources

Use authorizations may affect visual quality under all alternatives. New rights-of-way, leases, and permits, and road construction activities would have the potential to affect visual resources under all alternatives. Site specific potential for additional access (ROW) for power lines, pipelines, wind and cell towers also have potential to reduce visual quality, because approval of these projects would change the landscape indefinitely. Limiting future developments to designated utility corridors would help reduce effects on visual quality for some projects. VRM mitigation measures would help reduce effects on visual quality through VRM Class, and other BLM location and design standards.

Actions allowing motorized use on rights-of-way (ROW) through BLM public lands may also reduce visual quality, due to unauthorized cross-country motorized use on public lands previously inaccessible to either public or private motorized use, or by authorizing new or more developed Right-of Ways across public lands.

Alternative 1 would reduce visual quality on public lands by allowing more energy projects to occur, due to fewer acres of VRM Class I and II acres, (197,742 acres) and more VRM Class III and IV acres (258,640 acres) than any of the action alternatives; VRM I & II – 242,059 acres and VRM III & IV – 214,520 acres.

Acquisition of other lands to block up BLM public lands through land exchanges could enhance or detract from existing visual quality of public lands, depending on the lands acquired or public lands disposed. Over the long term, land acquisition of lands to block up existing public land ownership patterns enhances visual quality and provides stable land uses that trend toward enhancement of visual quality on landscapes.

Most public lands classified as Z-3 would not have high or sensitive visual qualities, but their natural condition may change by development, if disposed Under Alternative 1, visual quality would continue to be retained on public lands zoned 1 for retention. A greater number of acres may be exchanged out of public land ownership with no visual resource management to retain existing visual qualities under Alternative 1 than under any of the action alternatives 2-5 (Table 2-23).

Alternative 2 Effects on Visual Resources

Vegetation Management Effects on Visual Resources

Under this alternative, primary affects on visual quality would be from forest or woodland vegetation treatments to manage and reduce fuel loading toward FRCC 1. The magnitude of visual impacts would depend on the type of treatment and the number of acres of proposed forest and woodland treatment. Short-term effects are expected to create some visual contrasts between treated or burned and unburned areas.

However, these forest health management actions should not affect long-term visual quality in any alternative, if conducted on small, localized areas. Visual quality over the long-term would be expected to be higher, due to increased vegetative diversity resulting from vegetative treatment.

The reduced chance of stand replacing wildfire in forestlands would result from proactive pre-commercial and commercial thinning, resulting in long term benefits to visual quality in forestlands by minimizing or avoiding landscapes burned with limited or no live vegetation remaining. In this respect, Alternative 2 would result in a

lower probability of adverse visual effects from uncharacteristic fire due to the greater area of treatment proposed compared to vegetative actions under Alternative 1.

Riparian and Aquatic Habitat Management Effects on Visual Resources

Alternative 2 would provide higher levels of visual retention in riparian and aquatic areas by limiting motorized use to designated routes and trails than Alternative 1. The ACS aquatic strategy would also enhance visual quality by limiting or prohibiting activities or actions that would also result in reducing visual quality in riparian areas.

Alternative 2 would manage livestock in riparian and aquatic habitat and upland rangelands by limiting or prohibiting building fences, so no visual effects would occur from fencing under this alternative.

Fuels and Fire Management Effects on Visual Resources

The effects on visual resources from conducting treatments such as thinning and prescribed burns that remove vegetation in WUI areas would be the same as Alternative 1. The amount of visual effect is dependent on the vegetative type, size of project area, project objectives, layout and treatment type.

The effects of fuel and fire management treatment along improved roads through BLM public lands in areas with high visual sensitivity would be the same as Alternative 1, but more vegetative diversity may enhance visual quality over the long term in all of the action alternatives than alternative 1, due to more treated acres.

The effects of Initial fire attack and full suppression of wildland fires on visual quality would be the same as Alternative 1. Allowing fire use on up to 1500 acres under the all action alternatives could result in changes to the visual landscape in the short and long term by allowing fire to burn green juniper or conifer trees in landscapes.

Alternatives 2-5 would result in some fire ignitions being managed under Appropriate Management Response (AMR, including wildland fire use) with less suppression effects. Long term effects of these actions would help reduce potential catastrophic wildfire events and increase diversity of vegetation into the landscape, resulting in long term retention of visual quality and increased vegetative diversity in the landscape.

Wildlife Management Effects on Visual Resources

Under Alternative 2, wildlife seasonal motorized recreation restrictions on 332,995 acres and road density limits may enhance visual quality indirectly, providing motorized recreation users comply with these use restrictions.

Vegetation management for wildlife may affect landscape aesthetics along improved roads through BLM public lands in areas with high visual sensitivity if vegetation canopy removed on a long-term basis. Vegetative diversity projects for wildlife management are expected to enhance visual quality in long term by increasing vegetative diversity in the landscape.

No other long-term beneficial effects to visual quality are anticipated from wildlife management. Affected landscapes are largely located away from areas seen frequently by public.

Special Designations Effects on Visual Resources

Under Alternative 2 the effects of special designations on visual quality would be the same as alternative one, except public lands managed to protect wilderness characteristics would benefit from a higher level of visual protection, resulting from a VRM Class II classification. In addition, if Congress releases WSAs from wilderness review, a VRM Class II classification under the action alternatives would continue to ensure retention of visual qualities for these areas with a VRM Class II designation.

Classification of the North Fork John Day River as VRM Class II would add additional protection of the Scenic ORV and increase protection of the free-flowing character and ORVs of the North Fork John Day River. Potential WSR designation of public lands along the North Fork John Day River would also provide better protection of visual quality by managing these river segments to protect outstandingly remarkable scenic qualities in these river canyon areas.

Visual Resources Management Effects on Visual Resources

Under Alternative 2, protection of visual quality and the effects of other activities on visual quality would be the same as Alternative 1, with the following exception. A VRM Class II designation would include public lands in the North Fork John Day River and the Gilman Flat plateau area as well as public lands managed to protect wilderness characteristics, totaling 145,304 acres under this alternative and all of the other action alternatives.

A higher level of protection of scenic quality, particularly within the North Fork John Day River Canyon, Gilman Flat and public land areas having wilderness characteristics would occur under this alternative, than under Alternative 1. All of the action alternatives would have a slightly lower acreage of VRM Class III than Alternative 1, due to more acres classified as VRM Class II in the plan area (Table 4-9).

Recreation Management Effects on Visual Resources

The action alternatives would manage recreation use in a manner that would result in less visual effects to the landscape, compared to Alternative 1. Under this alternative, there would be no acres of public land open year-round to cross-country motorized use, reducing effects on visual quality, compared to Alternative 1.

Under the action alternatives, recreation activities would have different effects on visual quality, but all activities managed within a Special Recreation Management Area (SRMA) would have less effect on visual quality, due to more intense visitor management, such as limiting motorized use to designated roads and trails. Alternative 2 has a greater area managed under SRMAs than Alternative 1, helping avoid user-created trails that would reduce visual quality.

Managing recreation use for Primitive and Back Country recreation experiences (see Recreation section of Chapter 2) and opportunities on 134,678 acres of public land in the Lower John Day, Sutton Mountain and Johnson Heights areas would prohibit motorized use, avoiding potential effects of that use on visual quality.

The construction of new recreation sites or the expansion of existing sites under the action alternatives would not impact visual qualities, if VRM project mitigation is followed. Recreation development in popular recreation use areas would reduce visual impacts in many cases.

The action alternatives have more acreage seasonally closed to OHV use than Alternative 1, so less visual effects would occur under these alternatives, not allowing OHV use on public lands during the winter and spring on public lands more susceptible to the creation of visual scars on the landscape from vehicle, ATV and motorcycle tracks.

Under Alternative 2, travel restrictions would limit motorized use to designated roads and trails and would not allow new route or trails to occur, retaining visual quality where motorized recreation occurs. Alternative 2 limits OHV use to designated routes and trails on all public lands except designated OHV Play areas. OHV use would affect visual quality under this alternative, particularly in the Rudio Mountain seasonally open plateau area, where cross-country OHV use would result in additional visual scarring on the landscape.

Allowing cross-country OHV use in the 598 acre Golden Triangle area would create visual scaring on the landscape, but this area is small, limiting effects to visual quality in that area.

Energy and Mineral Resources Management Effects on Visual Resources

Alternative 2 would provide a smaller amount of public land acreage where energy projects would be allowed than Alternative 1, due to more public lands classified as VRM Class I and II. ACS guidelines and limiting OHV use to designated routes are also expected to add additional restrictions to energy and mineral resource exploration and development than Alternative 1. VRM project mitigation measures would help reduce the significance of the effects, but developments would reduce visual quality of the landscape where projects are allowed.

Land Tenure, Realty and Use Authorization Effects on Visual Resources

Under Alternative 2, existing visual quality on all public lands zoned as Z-1 would be enhanced due to additional public lands zoned Z-1 that are Special and Extensive Recreation Management Areas. Specifically, visual qualities would be retained on public lands zoned Z-1 along the main stem John Day River, the South and North Forks of the John Day River, Dixie Creek and Little Canyon Mountain areas, Rudio Mountain and Johnson Heights, and public lands surrounding Sutton Mountain.

The action alternatives have the largest acreage of public lands retained for future management and use, totaling 363,095 acres (Table 2-23). A greater number of acres would be zoned Z-3 under Alternatives 2 than Alternative 1, so visual qualities may be reduced on these tracts of public land.

Some scattered tracts of public land within the State Scenic Waterway boundary along the John Day River is also proposed to be in Z-3, totaling approximately 10 acres, located upriver from Service Creek. If this public land along the river were exchanged or sold, visual quality could be reduced in that area.

Other public lands zoned Z-3 are within the vicinity of the John Day River, but its unknown what effects could occur to visual quality if these lands were no longer public. Manmade improvements on these tracts of land visible from the river would reduce scenic quality along the main stem John Day river segment from Kimberly to Clarno river segment.

Visual quality would be lowered on public lands zoned 2, if these lands were exchanged out of BLM ownership. Visual quality on 72,454 acres of public land zoned 3 under the action alternatives may be sold or exchanged, so visual quality may be lowered over a greater area under alternative 2 than Alternative 1, depending on its new land use.

Alternative 2 would have the highest potential for loss of open space through potential disposal of 72,454 acres of Z-3 public lands, compared with 40,444 acres zoned Z-3 under Alternative 1. However, it is not certain the amount or location of public lands that would be disposed over the life of this plan.

Alternative 2 provides the largest amount of VRM Class I and II acres (242,711 acres) where Right-of-Way projects would not be allowed, or would be restricted if VRM Class objectives are met – (VRM I & II – 242,711 acres)and fewer VRM Class III and IV acres that provide more flexibility regarding alteration of the landscape - VRM III & IV – 213,899 acres.

Alternative 3 Effects on Visual Resources

This alternative would have the same effects to visual quality as Alternative 2, with the following exceptions. Increased miles of roads and trails available to motorized users would be expected to have more, or less effects to visual quality than alternative 2, depending on user compliance to the designated route restriction.

If motorized users remain on designated routes, the effects to visual quality would be the same as Alternative 2. However, if motorized users don't remain on designated routes, the creation of new routes off designated routes or trails would result in more scars on the landscape, resulting in more visual effects from this activity than under Alternative 2.

Alternative 4 Effects on Visual Resources

This alternative would have the same effects to visual quality as Alternative 2, with the following exceptions. No protective management of WSR ORVs would result in a lower level of protection of visual quality. Visual quality would be enhanced over all alternatives by not allowing any cross-country OHV use to occur in the 598 acre Golden Triangle area. Visual quality would be enhanced by limiting all motorized use in the Rudio Mountain seasonally open plateau area to designated routes year-round.

Alternative 5 Effects on Visual Resources

This alternative would have the same effects to visual quality as Alternative 4, except motorized use would be allowed on designated routes in the Golden Triangle area, limiting effects on visual quality to designated routes.

Summary of Effects on Visual Resources

Visual effects on all public lands except in the North Fork John Day River area would differ between Alternative 1 and all of the action alternatives. The absence of proactive vegetative and fuel treatments in Alternative 1 would result in reduced visual quality in the short and long-term, due to more catastrophic wildfire events burning untreated forestlands in the South and North Fork John Day River areas and in the Rudio Mountain area.

Retention of visual quality would highest under the action alternatives because all of the action alternatives have proactive vegetation and fuels treatment prescriptions on forestlands that would result in less potential for catastrophic wildfire events on forestlands in the South and North Forks of the John Day River and in the Rudio Mountain area.

In addition, under all action alternatives, the VRM Management Class of the North Fork John Day River area would be upgraded from VRM Class III and IV in Alternative 1, to VRM Class II in the river canyon and Gilman Flat and VRM Class III in the JV Ranch area in all of the action alternatives, increasing protection of existing visual quality in these areas.

Effects of OHV use on visual quality under all of the action alternatives would be less than the effects on visual quality under Alternative 1. All of the action alternatives would limit all motorized use to designated routes, prohibiting motorized use in sensitive wildlife areas seasonally and managing cross-country OHV use by limiting this activity to specific areas with seasonal restrictions, limiting use to small areas, or by not allowing this use at all.

Alternatives 2 and 3 would allow effects on visual quality to occur by authorizing seasonal cross-country motorized use on the Rudio Mountain plateau and by allowing cross-country OHV use in the 598 acre Golden Triangle area. However, these effects would be localized. A higher level of protection to visual quality of public lands would occur under Alternatives 4 and 5.

Other Effects on Visual Resources

Population growth in Central and Eastern Oregon and increased development in the plan area are expected to increase public sensitivity regarding visual quality. The visual quality of open space on BLM lands provided next to communities such as John Day and other communities will increase in importance over time.

Increased recreation, timber, and woodland management and WUI projects will increase short-term effects on visual quality, but over the long-term would not degrade visual quality, provided VRM mitigation and BMP measures are followed.

Reasonably foreseeable realty actions include several proposals for legislated land exchanges around Rudio Mountain and other areas. These land exchanges generally follow the direction and objectives of the Lands and Realty Objectives with a few exceptions, such as zoning. The range of effects from these actions is within the effects disclosed for all alternatives.

Wind development will continue to increase until all available areas from Condon and Grass Valley north to the Columbia River are developed. Other parts of the plan area with wind potential may be developed as well. Wind turbines currently being installed on private property measure 398 ft. high and are visible for miles in all directions. Turbines and high powered transmission lines associated with wind development will have a major effect on the visual resources of public and private lands. Less than 500 acres of VRM Class 2 is within areas of moderate potential for wind development.

Restricting Utility power lines to existing utility corridors would continue to maintain existing visual quality in these areas.

Special Designations

Introduction

Wild and Scenic Rivers

Analysis of the environmental consequences of the alternatives on Wild and Scenic Rivers (WSR) considered the following key resources or resource uses: Wild and Scenic River Management, Aquatic Resources, Visual Resource Management, and Recreation.

Indicators used to compare environmental consequences between alternatives are identified in Table 4-17.

Table 4-17. Comparison of management effects on Oustandingly Remarkable Values (ORVs*) of Wild and Scenic Rivers (WSR) by Alternative (* BLM public lands in WSR segment only).

ORVs would be affected by:	Common to ALL alternatives	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
WSR eligible/ suitable (or already designated)	195 mi. Already designated WSR	37 miles	37 miles	37 miles	0 miles	0 miles
WSR Classification (emphasis) Miles	195 mi. Rec Already designated WSR	0 mi Rec; 0 mi Scenic	0 mi Rec; 37 mi Scenic	19 mi Rec; 18 mi Scenic	0 mi Rec; 0 mi Scenic	0 mi Rec; 0 mi Scenic
VRM direction	195 mi. VRM	37 mi VRM III; 0 mi VRM II	37 mi VRM II; 0 mi VRM III	same as Alt. 2	same as Alt. 2	same as Alt. 2
New ACS direction	N/A	0 miles	232 miles	232 miles	232 miles	232 miles
Open OHV designation	____	258,064 acres Open	2 acres Open	600 acres Open	0 acres Open	2 acres Open
SRMA designation for North Fork John Day River	____	0 acres	52,033 acres	52,033 acres	52,033 acres	52,033 acres

Wild and Scenic River Assumptions

- 1 The existing 148 mile John Day River WSR segment and the 47 mile South Fork John Day WSR segment, totaling 195 miles would continue to be managed to protect the free-flowing character of these rivers and also protect and enhance river ORVs, according to the BLM Manual 8351 and the 2001 John Day River Management Plan ROD.
- 1 River segments found to meet eligibility criteria will receive interim protect of Outstandingly Remarkable Values until a planning decision determines suitability. A planning determination of “non-suitable” removes the interim protection.
- 1 For eligible river segments recommended as “suitable,” BLM would provide interim protection of the Outstandingly Remarkable Scenic, Recreation and Fisheries Values according to BLM Manual 8351, until Congressional action is taken to either designate the North Fork John Day River as a WSR, or release it from further Congressional review. If released by Congress, BLM would continue to protect scenery, recreation and fishery values through other management guidelines such as ACEC and VRM Class II designation and the Aquatic Conservation Strategy.
- 1 The State Scenic Waterway designations will continue into the future.
- 1 Current County zoning will continue to allow limited development on private land, subject to State Scenic Waterway regulations.
- 1 Existing ORVs will continue to be to be protected and enhanced through existing and proposed

management through other resource programs, laws and objectives, such as PACFISH, Aquatic Conservation Strategy and Visual Resource Management.

- 1 On the North Fork John Day River, the checkerboard land ownership pattern of public and private or state lands limits the ability to effectively manage river resource values for grazing, land-based recreation uses and provide public access to public lands without trespass on private lands.
- On the North Fork John Day River, the potential for energy development is considered low, because of the rural nature of the area and distance to highways and potential energy transmission corridors and existing State Scenic Waterway classification of the North Fork John Day River as an Accessible Natural River Area.
- 1 No water development would be allowed, given the high fishery, scenery and recreation ORVs of this river and existing State Scenic Waterway classification as an Accessible Natural River Area

Effects Common to All Alternatives

- 1 Almost all riparian and aquatic resource values would continue to not be accessible in WSR by motorized vehicle, due to mixed ownership patterns, lack of public easements through private land, rugged topography and steep or inaccessible river banks, limiting use to existing campsites and day-use areas, preventing pioneering of new user created routes.
- 1 No existing mining or oil and gas leases are located in these river canyons. Limiting future potential energy and mineral development to no surface occupancy within the river corridors of the John Day, South and North Forks of the John Day River would result in no affect to existing WSR ORVs and the ORVs of the North Fork John Day River.
- 1 Development of recreation facilities would be allowed on public lands but would be required to comply with State Scenic Waterway regulations, which allows development only if screened by topography and/ or vegetation.

Visual Resource, Wild and Scenic River, and Resource Use Effects on WSR

Under the action alternatives, the WSR Eligibility determination would provide adequate protection to the North Fork John Day River's free-flowing character and its ORVs. Protective management to the fishery, scenery and recreation ORVs of the North Fork John Day River would provide adequate protection of these values, subject to valid existing rights. Management activities and authorized uses would not be allowed to adversely affect either eligibility or tentative classifications.

Alternative 1 Effects on Wild and Scenic Rivers

Under Alternative 1, existing recreation, scenery and fishery ORVs would continue to be protected by existing federal and State Scenic Waterway regulations. VRM Management Classes for public lands in the plan area would continue to provide protection of recreation and scenic ORVs on public lands within existing designated WSRs.

The scenery ORV would receive additional protection and enhancement through existing State Scenic Waterway scenic regulations that limit, or prohibit activities that reduce scenic quality on public and private lands within ¼ on each side of a state designated waterway. Protection of scenic quality under State Scenic Waterway regulations would continue on the main-stem John Day River, the North Fork and South Fork John Day Rivers, which are State Scenic Waterways.

Recreation ORVs would be protected through federal and state regulations providing protection of scenic quality, maintaining a scenic river canyon area for recreation activities such as rafting, fishing and camping to occur. The Fishery ORV would continue to be protected through existing PacFish and water quality regulations.

The free-flowing character of the North Fork John Day River would not receive additional federal protection through WSR designation. However, other federal regulations such as PacFish and Oregon State Scenic Waterway, ODFW, DEQ and other regulations would help protect the free-flowing character of the North Fork John Day River.

Alternative 2 Effects on Wild and Scenic Rivers

Under Alternatives 2 and 5, potential Congressional designation of the North Fork John Day River as part of the national WSR system (with a potential classification as scenic) would provide an additional level of protection to the scenery and fisheries outstandingly remarkable values than protection already provided under the State Scenic Waterway classification as Accessible Natural River Area, PACFISH, and the Endangered Species Act.

Opportunities for increasing public awareness of the river ORVs and developing partnerships with adjacent landowners to protect and enhance the river ORVs would be enhanced if this river was designated as a Wild and Scenic River.

The scenic ORVs of all existing WSRs would continue to benefit from existing VRM Class II management on public lands next to 195 miles of WSR on the main stem John Day River and the South Fork John Day River. The Scenery ORV of the North Fork John Day river would be protected, enhanced and would benefit more under Alternatives, due to higher retention of natural landscapes on public lands within this 37 mile river segment than under the No Action Alternative.

This enhancement is due to VRM Class II management objectives requiring any changes in any of the basic elements (form, line, color, texture) caused by a management activity not be evident in the characteristic landscape. Contrasts are seen, but must not attract attention.

This alternative would be the most consistent of any other alternative, with the existing State Scenic Waterway classification of this river segment as an Accessible Natural River Area. Under State Scenic Waterway regulations, the emphasis of this state river classification is to retain existing visual quality, while allowing roaded access.

The Aquatic Conservation Strategy would provide additional protection to the fisheries and scenic ORVs over Alternative 1, by ensuring uses do not affect riparian and aquatic resources, through aquatic and riparian BMPs.

If designated by Congress as a WSR, another important effect of recommending the North Fork John Day River eligible river as suitable for potential designation by Congress would result in securing a guarantee of free-flowing character of the North Fork John Day River, in perpetuity, as provided through federal Wild and Scenic River designation.

OHV limitations restricting motorized use to designated roads and trails would help protect scenic and fisheries ORVs by limiting motorized use to designated roads and trails. The recreation ORV would be protected and enhanced by managing OHV use to allow short and long term recreation use within this river corridor.

Designation of the North Fork John Day River as a Special Recreation Management Area would help increase funding to manage recreation use, while protecting and enhancing recreation, scenery and fishery ORV values.

Alternative 3 Effects on Wild and Scenic Rivers

Under Alternative 3, the effects of other activities on Wild and Scenic Outstandingly Remarkable Scenery, Recreation and Fisheries values would be the same as Alternative 2, with the following exception. If designated as a WSR under this alternative, the recreational classification on public lands from Camas Creek to Mallory Creek would be managed similar to the Scenic classification for this river segment under Alternative 2, but this alternative would provide more flexibility in how all public uses are managed and allow a higher level of recreation development than Alternative 2. For example, recreation development such as campsites, campgrounds and day-use areas may be more apparent and not blend into the landscape as well as these developments would under Alternative 2, with a Scenic classification.

Alternative 4 Effects on Wild and Scenic Rivers

Under Alternative 4, the effects of not recommending the 37 mile river segment of the North Fork John Day River eligible river as suitable for potential designation by Congress would result in not securing a guarantee of free-flowing character of the North Fork John Day River, provided as part of a federal Wild and Scenic River designation.

No federal interim protection of the scenic, recreation and fishery ORVs would occur. The existing protections already provided by the State Scenic Waterway designation of the North Fork as an Accessible Natural River Area, PACFISH and ICBMP management guidelines would continue to provide a lower level of protection of river ORV values of the North Fork John Day River than provided under Alternatives 2, 3, and 5.

Existing VRM management on existing WSR ORV's would be the same under Alternative 3 as Alternative 2 and 5. Designation of VRM Class II on public lands within the North Fork John Day River would also have the same effects to the river ORV's as Alternative 2 and 5. Limiting motorized use to designated roads and trails and designation of the North Fork John Day River as a Special Recreation Management Area would also have the same effects as Alternative 2 and 5.

Alternative 5 Effects on Wild and Scenic Rivers

The effects of this alternative would be the same as Alternative 2.

Summary of Alternative Management Effects on Wild and Scenic Rivers

Under Alternative 1, the North Fork John Day River would not be managed under BLM manual 8351 to protect the identified ORVs. Existing BLM management would provide a lower level of protection of fishery, scenery and recreation ORVs than Alternatives 2, 3, and 5.

Under Alternative 4, the North Fork John Day River would not be protected by BLM WSR interim management regulations; BLM Manual 8351. River ORVs would receive a lower level of protection through existing protections already provided by the State Scenic Waterway designation of the North Fork as an Accessible Natural River Area, PACFISH and ICBMP management guidelines. There would be no guarantee of protection of free-flowing river character under this alternative.

Other Effects on Wild and Scenic Rivers

Potential negative impacts to scenic, recreation and fisheries outstandingly remarkable values have resulted from past human activities such as logging, road development for timber and commerce through eastern Oregon, livestock grazing year round in riparian and upland areas, community development and dams on some tributaries in the John Day River Basin. Past logging, skid and haul roads parallel and upslope on both sides of the North Fork John Day River have also occurred in the past.

These actions have had an effect on the ORVs of existing WSRs and have had an effect on the ORVs of the North Fork John Day River. Current and expected future WSR management of ORVs in designated WSR segments of the John Day River and South Fork John Day River will continue to protect and enhance these ORVs by implementing management plan actions focused on the protection and enhancement of ORVs along these rivers.

Current and future protection of existing ORVs on the North Fork John Day River are expected to continue through proposed VRM Management Class II objectives for the river canyon, Aquatic Conservation Strategy, and limiting motorized use to designated roads and trails, when combined, provide a higher level of protection than exists under the existing situation.

State Scenic Waterway Accessible Natural River Area regulations will also continue to protect ORVs of the North Fork John Day River.

Although visitor use is expected to increase over the long term on all existing WSRs, federal Wild and Scenic River designation will continue to provide the guarantee of short and long term free flowing water, free of water impoundment. Increased public awareness and an added layer of protection and partnership opportunities with adjacent landowners and user groups would occur with WSR designation. Additional funding may also result from WSR designation. These benefits would be expected to also occur on public lands along the North Fork John Day River, if Congressional action resulted in WSR designation for this waterway.

Wilderness Study Areas

Introduction

Analysis of the environmental consequences of the alternatives on Wilderness Study Areas considered the following key resources or resource uses: Fuels and Fire Management, Wildlife, WSAs, ACECs, Byways, Livestock Grazing, Recreation, and Travel Management.

Indicators used to compare environmental consequences between alternatives include: degree of protection of WSA values.

Wilderness Study Area Assumptions

- 1 By managing Wilderness Study Areas according to the Interim Management Policy for Lands Under Wilderness Review (BLM 1995), BLM would conduct regular WSA monitoring and work to deter, detect, report and rehabilitate any damage or impairment to WSAs, so as to maintain their suitability for designation.
- 1 Funding will be available to conduct regular WSA monitoring work and take necessary action to prevent and correct violations.
- 1 Projects proposed within a WSA such as AMR (including wildland fire use), riparian and wildlife habitat improvements, noxious weed control, wild horse management, and grazing improvements require a site-specific analysis in accordance with the IMP and must meet the "non-impairment criteria" in order to proceed.
- 1 The IMP provides specific guidance for management of most uses in WSAs, including commercial permits, OHV use, motorized vehicle use, energy and mineral uses and land use authorizations.

The following resources or resource uses will have no effect on WSAs: Soils, Air Quality, Vegetation, Aquatic Resources, Special Status Plants, Noxious Weed Control, Agricultural Lands, Wild Horses, Wilderness Characteristics, Cave Resources, Visual Resources, Wild and Scenic Rivers, Native American Uses, Paleontological Resources, Cultural Resources, Facilities, General, Leasable, Locatable, and Salable minerals, Lands and Realty, Land Tenure, and Use Authorizations.

Analysis of the Effects of the Alternatives on Wilderness Study Areas

Fire and Fuels Management Effects on Wilderness Study Areas

Wildland fire use projects under the action alternatives may better improve ecosystem health in some WSAs than under Alternative 1. Mechanical juniper treatments are not permitted in any case.

Managing fire within the full range of AMR would meet the WSA objective of allowing fire to play a natural role whenever possible. Wildland fire is an important tool for improving ecosystem health within WSAs where mechanized tools are not an option. When managing fire in a WSA, Minimum impact management tactics would be used and a Resource Advisor present during a wildfire to bring forward any concerns specific to the WSA.

Wildlife Management Effects on Wilderness Study Areas

Greater seasonal area closures for motorized vehicles under Alternatives 2-5 would close most existing motorized routes within WSAs during the winter season. There are currently few routes open to motorized use in WSAs, and some of these routes are already closed during the winter season to protect soils and road surfaces during muddy conditions. Current winter use of these routes is minimal, and some of the winter activities are in illegal in nature, including unauthorized wood cutting and unauthorized cross-country vehicle use associated with horn hunting. Closing most of the remaining routes to motorized use under the action alternatives during winter months may help cut down on illegal activities, but would also close motorized access to legal users, requiring all users to travel within the WSAs by foot, horse, or boat during the winter season.

Wilderness Study Area Management Effects on Wilderness Study Areas

In all alternatives, WSAs will be managed to maintain their suitability for Wilderness designation by Congress. Improving access to public information about WSAs and their management through various media including the BLM website will help visitors and neighbors understand which activities and uses are allowable in WSAs, hopefully resulting in decreased violations. The information will allow the public to identify WSA locations and boundaries, locate designated motorized vehicle routes on a map, plan ahead for a visit, know the regulations in advance, and contact the BLM with questions or to report a violation.

Inserting relevant IMP requirements (where applicable) into grazing lease agreements and recreation permit stipulations will clarify requirements for operating within a WSA, helping to reduce confusion and improve compliance.

Establishing partnerships to assist the BLM with monitoring work will increase field monitoring presence, which is key to understanding where and how violations are taking place so they can be deterred and prevented. Informing the public about violations and seeking volunteers to assist with reclamation will help increase awareness of these management problems and challenge the public to become involved in solutions.

Contingent Allocations:

If Congress releases a WSA from further consideration as wilderness, these lands would no longer be managed according to the IMP and would be managed according to contingent allocations which are specific to each WSA. For lands released from WSA status, changing the VRM Class from a VRM Class I to a VRM Class II would reduce protections to the visual resources of these lands. Limited mechanical treatments to reduce juniper encroachment could be conducted on these lands.

Designating the lands within the existing North Pole Ridge, Thirtymile and Lower John Day WSAs as the Lower John Day ACEC would protect the scenic values of these lands.

Managing the lands within the existing Spring Basin WSA under no-surface-occupancy requirements for oil and gas development and closed to wind development would help to protect the scenic value of these lands. Continuing to close these lands to motorized vehicle use except for administrative use would protect the highly erosive soils in these areas and be consistent with the primitive recreation setting and non-motorized travel emphasis identified for this portion of the John Day River Special Recreation Management Area.

Under the action alternatives managing the lands within the existing Sutton Mountain WSA under the management proposed for the John Day Paleontology ACEC (See John Day Paleontology ACEC Alternatives in Chapter 2), and continuing to manage these lands under no-surface-occupancy requirements for oil and gas development and closed to wind development would better protect the scenic value of these lands. Continuing to limit motorized vehicle use to signed designated routes except for administrative use would help to maintain the primitive recreation setting and non-motorized travel emphasis identified for this portion of the Bridge Creek Special Recreation Management.

Under the action alternatives, managing the lands within the existing Pat's Cabin WSA under no-surface-occupancy requirements for oil and gas development and closed to wind development would better protect the scenic value of these lands than under Alternative 1. Continuing to close these lands to motorized vehicle use except for administrative use would protect the highly erosive soils in this area and help maintain the primitive recreation setting and non-motorized travel emphasis identified for this portion of the Bridge Creek Special Recreation Management Area.

Under the action alternatives managing the lands within the existing Aldrich Mountain WSA under no-surface-occupancy requirements for oil and gas development and closed to wind development would better protect the scenic value of these lands than under Alternative 1. Continuing to limit motorized vehicle use to signed designated routes except for administrative use would help slow the spread of noxious weeds and maintain the primitive recreation setting and non-motorized travel emphasis identified for this portion of the South Fork Special Recreation Management Area.

Under the action alternatives managing the lands within the existing Strawberry Mountain WSA as closed to motorized vehicle use, except for administrative use, would help protect the adjacent USFS Wilderness Area from motorized vehicle intrusions.

ACEC/RNA Management Effects on Wilderness Study Areas

Designating the 6,639 acre Black Canyon ACEC/RNA to be managed as a Research Natural Area (RNA) inside the existing Sutton Mountain WSA for the purpose of protecting native plant communities under the action alternatives would help to protect the special plant features identified for this WSA. The IMP takes precedence over ACEC/RNA direction unless the other management direction is more restrictive and protective than the IMP, in which case the more restrictive management would be followed. Under ACEC/RNA direction, livestock grazing would not be permitted within the RNA.

Designating the John Day Paleontology ACEC that overlaps the Sutton Mountain WSA for the purpose of protecting paleontological resources would better protect the special paleontological features identified for this WSA under Alternatives 2-5 than Alternative 1. The IMP takes precedence over ACEC/RNA direction unless the other management direction is more restrictive and protective than the IMP, in which case the more restrictive management would be followed.

Contingent Designations:

Under the action alternatives, if Sutton Mountain WSA were released from consideration for wilderness by Congress, managing the Black Canyon ACEC/RNA and the John Day Paleontology ACEC according to the ACEC/RNA standards instead of the IMP would continue to offer protection for the scenic values of these lands. Alternative 1 would not offer this level of management. The BLM would consider fencing and signing the perimeter of the RNA.

Under the action alternatives, if the North Pole Ridge, Thirtymile, or Lower John Day WSA were released from consideration for wilderness by Congress, designating these lands as the Lower John Day ACEC and managing them according to the ACEC/RNA and VRM Class II standards would continue to offer protection for the scenic values of these lands. Alternative 1 would not offer this level of management.

Byways Effects on Wilderness Study Areas

Under Alternatives 2-5, designating the Sutton Mountain BLM Backcountry Byway or Scenic Byway would attract more visitors to the Sutton Mountain and Pat's Cabin WSAs, increasing the need for visitor information, Leave No Trace education, and WSA patrols in order to maintain wilderness values.

Livestock Grazing Management Effects on Wilderness Study Areas

In all alternatives, changes in livestock type or season of use and projects proposed within a WSA require a site-specific analysis in accordance with the IMP and must meet "non-impairment criteria".

Recreation Management Effects on Wilderness Study Areas

Special Recreation Management Area:

Existing management goals identified for the John Day River SRMA to be continued in Alternative 1, plus management goals identified for additional SRMAs in Alternatives 2-5, including recreation management zones, would be consistent with the IMP and with the desired recreation setting for WSAs.

Recreation Permit:

Continuing the existing moratorium on new upland commercial permits in Alternative 1 would have no effect on WSAs. Discontinuing the moratorium in Alternative 2 may increase the availability of new annual upland commercial permits in some WSAs, pending the results of site-specific NEPA analyses.

OHV:

In all alternatives, the existing OHV classification for each WSA, limited or closed, would be continued.

Native American Uses

Under all alternatives, avoidance of traditional use sites that are identified by a recognized tribal government within the plan area would be the preferred and most common method to eliminate or reduce adverse impacts. However, if avoidance would not be possible, other impact reduction measures would be developed in consultation with the tribal government having an identified interest. Examples of such measures include timing the management action to occur during a period when traditional users are not present on the site, or timing the action to enhance a resource for future use, and permitting use of an alternative location acceptable to traditional users. In those instances when tribal governments would not be able to provide traditional use site locations in advance of projects, it would not be possible to take measures to protect a known resource of concern, because some impacts could occur at those locations and others unknown to BLM.

Paleontology Resources

Indicators used to compare environmental consequences between alternatives include:
Paleontology resource localities, which are the basic unit of analysis for the purposes of fossil resource management.

Assumptions: Paleontology resource localities would be located as a result of pre-disturbance inventories. The amount of damage to paleontology localities would vary little between all the alternatives. Under all alternatives, less than 1% of localities would be damaged per decade across the plan area.

Nearly all impacts to paleontology localities would be reduced or eliminated under all alternatives through the practice of pre-disturbance locality discovery methods over planned or permitted project areas and the application of avoidance or other protection measures on identified localities. However, locality avoidance would not always be possible which would result in some incidental or inadvertent loss of localities or locality information. Examples include:

- Localities that cannot be entirely avoided by project redesign without eliminating the resource benefits provided by the project.
- Projects that cannot be relocated or redesigned. For example, a ridge saddle may be the only economic and engineering feasible location for an access road.
- 1 Projects where the locality is not visible on the surface and remains unknown.

Localities are not evenly distributed across the landscape or across landforms. Although there are exceptions, most paleontology localities occur throughout the middle and upper stretches of the river basin (see Paleontology Resources, Chapter 3). There are 155 paleontology localities recorded within the planning unit.

Any ground-disturbing action, which includes timber harvest, fire and fuels management, 1
recreation management, grazing and off-highway vehicle use, may damage or destroy paleontology resources (See the Paleontology Resources section of Chapter 3). Effects include: 1

- 1 For road construction, no localities were reported damaged in the plan area so the damage rate is 0%.
- 1 For fires and fuels management, no localities were reported damaged in the last 12 years per 12,700 treated acres annually on average in the plan area. Fire damage to fossil localities would be unlikely as most localities have no vegetation. Suppression activities related to wildfires have the potential to impact some localities, especially in vegetatively barren exposures that are used as fire line anchor points or safety zones.
- 1 For recreation site development and use, no localities were reported damaged from implemented projects. However, it is assumed that locality damage would occasionally occur if recreation sites are placed near localities.

- 1 Off-highway vehicle use that occurs on existing and designated roads does not impact paleontological localities. Use that occurs outside of existing and designated roads could damage localities. One recorded locality has been damaged as a result of off-highway or motor vehicle use outside of existing and designated roads.

Under the No Action Alternative, paleontological practices will be guided by existing laws and guidance. However, fuels/fire treatment acres will likely be reduced over time as large-scale treatments become less common. The reduction in large-scale projects will be due to the fact that large-scale areas were treated in the past and there will be fewer areas of such size available for such actions. Ground disturbing hazardous fuels treatments would average 3600 acres annually, and average a total of 108,000 acres over the next 30 years. No paleontology localities have been damaged as a result of implemented fuel/fire treatments under existing management to date.

Under the No Action Alternative, damage to paleontological localities due to implemented road construction, recreational site development and use, and off-highway vehicle use would be minimal.

Under the action alternatives, paleontological practices will be the same as Alternative 1. Continued BLM support of the interagency agreement with the John Day Fossil Beds National Monument provides the BLM with professional and technical assistance, as needed, for the majority of fossil resources in the plan area and the best available information for landscape and site-specific planning decisions related to paleontology resources.

Continuing this relationship would be a continuation of existing practice within the plan area that is not specifically authorized by the existing RMP. The management of paleontology resources under the action alternatives makes an existing practice a land use plan decision.

Under all of the action alternatives, fuels and fire treatments would be conducted on an average of 5900 acres annually and a total average figure of 177,000 acres for the next 30 years. If no localities were damaged as a result of 12,700 acres treated annually over the past 12 years (a total of 152,409 acres) then we can assume that over the next 30 years, pre-disturbance surveys will continue to prevent effects on paleo resources.

Under all alternatives, damage to paleontology localities due to implemented road construction, recreational site development and use, grazing development, and off-highway vehicle use on designated roads and trails would be minimal.

The John Day Basin Paleontology ACEC is proposed under the action alternatives (2-5). The proposed ACEC has limited restrictions due to the conflict between identifying the specific locations for planning purposes and the proprietary nature of the locations. Most if not all potential impacts to the specific ACEC units can be dealt with through existing reviews and processes. The primary reason for the ACEC is to ensure that the selected ACEC units are recognized as significant and conserved for research and interpretation into the future as important components of a broader scientific and management approach that the BLM shares with the John Day Fossil Beds National Monument.

Cultural Resources

Introduction

Indicators used to compare environmental consequences between alternatives include:
Isolates and sites (cultural properties consist of isolates and sites. Sites are the basic unit of analysis for the purposes of Section 106 of the NHPA (1966, as amended)). 1

Assumptions: Cultural resource sites would be located as a result of pre-disturbance inventories. The amount of damage to cultural sites would vary little between all the alternatives. Under all alternatives, less than 1% of sites would be damaged per decade across the plan area.

Effects of Alternatives on Cultural Resources

Nearly all impacts to cultural sites would be reduced or eliminated under all alternatives through the practice of pre-disturbance site discovery methods over planned or permitted project areas and the application of avoidance or other protection measures on identified sites. However, site avoidance would not always be possible which would result in some incidental or inadvertent loss of sites or site values. Examples include:

- 1 Sites that cannot be entirely avoided by project redesign without eliminating the resource benefits provided by the project.
- Projects that cannot be relocated or redesigned. For example, a ridge saddle may be the only economic and engineering feasible location for an access road.
- 1 Site values that are visually dependent on setting.
- 1 Sites that are not fully identified prior to ground disturbing actions due to lack of surface manifestations or reduced surface visibility. For example, some sites are partially or entirely below the ground surface or surface artifacts are not visible during inventory due to dense ground vegetation and thick duff cover.

Sites are not evenly distributed across the landscape or across landforms. As stated in Chapter 3, the majority of BLM land in the plan area occurs within the John Day River canyon where there exists a relatively narrow riparian zone and floodplain and steep to moderately sloping canyon walls. A smaller portion of BLM lands in the planning unit exhibits upland topography (see Chapter 3, Map 17, and Table 3-1).

Data is available for eleven of the last seventeen years (1990-2007) for the Prineville District including acres inventoried at the Class III (intensive) level, the number of newly discovered and recorded sites, and the number of sites damaged by implemented projects. The data is not totally specific to the planning unit only. However, district findings apply to the plan area and the number of sites that will be found in the future per acre inventoried and the number of sites damaged per project disturbed acre can be projected, as well as the correlations between site characteristics and environmental attributes, using the OHIMS database (below).

First, a total of 74,244 acres of Class III survey was completed for the District in the eleven years for which data is available. The number of acres inventoried for each year is unevenly distributed. Class III survey occurred in the other six years as well so the total number of acres surveyed over the seventeen years in the District is greater than 74,244. The total number of acres surveyed in the plan area, however, is estimated to be one third again as small (roughly 50,000 acres).

Second, the number of sites recorded for the District for those eleven years is 803 sites. Again, the number of recorded sites would be higher if the figures were included for the missing years. The number of newly recorded sites each year is uneven. Currently, there are 439 sites recorded in the John Day basin. Not all, but most, of those sites were recorded in the period of time under consideration. Over the eleven years for which there is specific data, however, only one site was reported being damaged from an implemented project.

Any ground-disturbing action, which includes timber harvest, fire and fuels management, 1
recreation management, grazing and off-highway vehicle use, can damage or destroy cultural resources (See the Cultural Resources section of Chapter 3). In summary: 1

- 1 For road construction, no sites were reported damaged in the plan area so the damage rate is 0%.
- 1 For fires and fuels management, only one site (.23%) was reported damaged in the last 12 years per 12,700 treated acres annually on average in the plan area. Damage to one site does not provide enough data to develop a meaningful correlation between the number of acres treated and the risk of damaging cultural sites. However, it is assumed that damage to archaeological sites would occur occasionally. Fuel treatments also reduce the risk of wildfires damaging sites. While fuel treatments would reduce the risk of wildfires damaging sites, there is no quantified data on risk reduction.
- 1 For recreation site development and use, no sites were reported damaged from implemented projects. However, it is assumed that site damage would occasionally occur.
- 1 Off-highway vehicle use that occurs on existing and designated roads does not impact archaeology sites. Use that occurs outside of existing and designated roads could damage sites. No sites have been reported damaged by off-highway vehicle use within the plan area.

Under the No Action alternative, archaeological practices will be guided by existing laws and guidance. Under this alternative (alternative 1), fuels and fire treatment acres will likely be reduced over time as broad-scale treatments become less common. The reduction in broad-scale projects will be due to the fact that broad-scale areas were treated in the past and there will be fewer areas of such size available for such actions. Ground disturbing hazardous fuels treatments would average 3600 acres annually, and average a total of 108,000 acres over the next 30 years. If only one site was damaged as a result of 12,700 acres treated annually over the past 12 years (a total of 152,409 acres), then we can assume that over the next 30 years only one site would be damaged.

Under the No Action Alternative, damage due to implemented road construction, recreational site development and use, and off-highway vehicle use would be unlikely to occur.

Under all of the alternatives, archaeological practices will be the same as the No Action alternative plus the use of the Oregon Heritage Information Management System (OHIMS) database. Continuing support for the OHIMS database would provide for systematic storage of standardized and comparative archaeological information and provide an efficient way to retrieve that information when needed. This would provide the best available data for landscape and site specific planning level decisions related to cultural resources, particularly as it relates to site significance and site management categorization. Supporting the OHIMS database would be a continuation of existing practice within the plan area that is not specifically authorized by the existing RMP. The action alternatives adopt existing practice for management of cultural resources, which enables the most efficient implementation of land use plan decisions, virtually imperative for analyses across landscapes of mixed ownerships and scattered tracts, to transcend BLM land-management patterns and analyze past land uses on a watershed-scale .

Under the action alternatives, fuels and fire treatments would be conducted on an average of 5900 acres annually and a total average figure of 177,000 acres for the next 30 years. If only one site was damaged as a result of 12,700 acres treated annually over the past 12 years (a total of 152,409 acres) then we can assume that over the next 30 years no more than two sites would be damaged.

Under the action alternatives, damage to archaeological sites due to road construction, recreational site development and use, grazing development, and off-highway vehicle use on designated roads and trails would be unlikely to occur.

Livestock Grazing

Introduction

Analysis of the environmental consequences of the alternatives on livestock grazing considered the following resources or resource uses: effects of vegetation treatments, including fire management and noxious weed actions, and management for agricultural land, wildlife, Wilderness Characteristics, and special designations on permitted use.

Permitted use was the indicator use to compare and assess these effects. Permitted use (defined as amount of forage, expressed in animal unit months (AUMs), allocated by a land use plan for livestock grazing in an allotment under a lease) was chosen as an indicator because it is assumed to be the primary unit of value provided by this resource use which directly impacts local economies. While management actions may cause livestock operations to vary practices, such as grazing schedules or fence construction specifications, such modifications are assumed to be inconveniences compared to a decrease in the value of the lease.

Livestock Grazing Assumptions

- Vegetation treatments will require an average of two years of rest from livestock grazing following implementation. Prescribed fire treatments will also require one year of rest prior to treatment.
- Few vegetation treatments will correspond exactly to pasture or allotment boundaries requiring three times more area than the area treated to be rested from livestock grazing.

- 1 Since forage production varies with location and vegetation treatment locations have not been specified, a basin-wide production of 15 acres per AUM was assumed for analysis purposes.
- 1 All vegetation treatments will increase forage quantity and quality, but the additional forage would generally be allocated to wildlife. The additional forage could be allocated to livestock on a temporary non-renewable basis for which site-specific analysis would be performed.
- 1 As agricultural lands are converted to native vegetation, the use of those lands will shift from cultivation to livestock grazing. Since forage production varies with location, for converted agricultural lands a basin-wide production of 7 acres per AUM will be assumed for analysis purposes.
- 1 For analysis purposes only, 100% of applicable permits are assumed to be relinquished.
- 1 For analysis purposes only, when the field office manager is given a choice (for example, open or reserve forage allotment) the "least harvest" option is assumed to be chosen.
- 1 For analysis purposes only, forage harvested on Reserve Forage Allotments is assumed to be no less than 33% of available AUMs over the long term, or the allotment would be fully grazed at least once every three years.
- 1 In all alternatives, allotment monitoring, evaluation, and rangeland health assessments (and subsequent site-specific analyses) may result in changes in forage allocation, season of livestock use, and construction of new fences, pipelines, and other range developments to meet resource goals and objectives.
- 1 Grazing preference applications for areas with no active preference will continue to be evaluated according to direction provided in 43 CFR 4100 and, for alternatives 2 - 5, the grazing matrix.
- 1 The actual effects of these forage reductions on individual lessees are unknown, but in some cases, especially those alternatives that depend upon closures, the result could be that the lessees cease ranching and sell their base properties, depending upon individual lessees' flexibility and dependence on specific forage.
- 1 Reduced AUMs mean lessees must either reduce herd size, lease other pasture, decrease the amount of time they graze livestock on public land, or place more grazing pressure (more animals for longer time) on their private land.
- 1 The Standards for Rangeland Health provide a system to monitor and assess range conditions and make changes to the individual grazing systems, including the timing, intensity, and season of use. Since this plan does not propose changes in livestock grazing intensity or season of use and existing guidance (Standards for Rangeland Health, Clean Water Act, others) directs the BLM to assess and change management to address problems, the ecological effects of livestock grazing are generally not reviewed in this plan.
- 1 Objectives for the livestock grazing program management include reducing conflicts. In the Chapter 2 Livestock Grazing section, conflict is defined as the problems that tend to increase as human uses in and adjacent to grazing allotments increase. These problems include stray livestock on busy roads and private land resulting from cut fences, inadequate fence maintenance, and failure to close gates. The greater the conflicts, the higher the management costs for both the lessee and the BLM, and the lower the satisfaction of the user and adjacent landowner. There is a corresponding drop in livestock operator demand for an allotment when the conflicts are high.
- 1 Alternative 1 assumes that existing guidance would adequately solve conflicts, and that grazing lessees, adjacent private land owners, recreationists, and other public land users can make adjustments as needed to lessen or resolve conflicts. In Alternatives 2 - 5, the assumption is that existing guidance does not go far enough in solving conflicts, and in some areas the preferred solution is to discontinue livestock grazing.
- 1 In Alternatives 2 - 5, the definition of conflict includes an ecological conflict criterion. This criterion does not replace existing guidance (e.g., Standards for Rangeland Health), which adequately directs monitoring and assessment of ecological factors. Instead, it provides a quick estimate of the potential for ecological conflicts with livestock grazing and provides a way for BLM decision makers to integrate potential social, economic and ecological criteria when making decisions about livestock grazing use in an area.
- 1 Effects of the various alternatives can be assessed by comparing the relative amount of acres with Low, Moderate, or High potential for conflict or demand. Models are used in this analysis to estimate which allotments have the highest potential for conflict. The estimates are then used to make decisions about

where conflicts might be high enough to warrant modification or discontinuance of grazing. The models used in this analysis to estimate conflict and demand are described in detail in Chapter 2.

- 1 The alternatives present a range of solutions for reducing conflict, some of which involve making some allotments unavailable for livestock grazing. Grazing reductions are temporary, for the life of the plan only, and would be re-evaluated during the next planning cycle.
- 1 Closing an area to grazing is one way to reduce conflicts. In Alternatives 2 - 5, some allotments are placed in Reserve Forage Allotment (RFA) status, which also potentially reduces conflicts, as the allotment is not likely to be grazed as frequently as before. Also, grazing can be shifted from a higher conflict area to an RFA, which has the potential to reduce conflict and increase lessee flexibility to deal with forage losses.
- 1 Lessees respond to loss of public AUMs by increasing productivity on base properties, purchasing or leasing alternate pasture, buying hay and feeding on owned or leased land, or by selling all or a portion of their herd. Lessees' options are more flexible when they have a larger ratio of owned / leased pasture versus public land, when there is leaseable pasture nearby and / or the lessee can easily or cheaply haul animals to new pasture, when there are few seasonal restrictions on public and private land they graze, or when they ranch as a "hobby" and can afford the increased costs of alternate pastures or feed sources.
- 1 Actual effects will be dependent on the private business decisions made by individual lessees based on their individual circumstances. A lessees' ability to withstand AUM losses depends on his reliance on federal forage. Reliance is high when lessees' private land acreage is low, or his ability to haul livestock to alternate pastures is low.
- 1 We do not know the lessees' dependence on federal forage, so we do not know how AUM losses would affect individual lessees' overall grazing operation. A high dependence would make it more likely that AUM losses would cause lessees to cease grazing altogether, perhaps even selling their private property if the only income came from livestock grazing. Lessees with low dependence on federal forage could more easily absorb AUM losses with no change to their overall grazing operation. Most forage reductions would not take place unless grazing lessees voluntarily relinquishes their permit. This is assumed to reduce effects on the individual lessee, though the impact on the local economy would be the same as if the closure were forced. A study (Rowe *et al.*, 2001) in a rapidly developing area in Colorado examined the factors influencing ranchers who graze on public land to sell their base property (private land to which the grazing privileges are attached). "Since ranch land is often the primary target for subdivision, ranchers play an important role in this pattern of land use change," say the authors. A rancher's decision to sell is affected by changes in federal grazing policy, local land-use planning efforts, and development of surrounding land. Changes in zoning and development can raise property values, increase taxes, and require more frequent checks of gates, fences, and livestock. But the decision is also influenced by non-economic factors, say the authors. "Ranchers continue to ranch despite financial difficulties. They stay because of... sense of place, attractiveness of lifestyle, family values, and tradition."

Livestock Grazing Management Summary

This section outlines the effects anticipated on the grazing management program for each of the alternatives. Table 4-18 'Matrix Results' summarizes the permitted use, expressed in animal unit months (AUMs), available in the plan area for the current situation and for each alternative. The AUM figures shown for Alternatives 2 - 5 (the preferred alternative) assume that 100% of applicable grazing permits are relinquished. The "Close or RFA" and "Open or RFA" categories are manager discretion categories.

Table 4-18. Grazing Matrix Results (AUMs).

Category	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Open	27,147	9,897	10,043	4,132	9,897
Open or RFA	0	1,137	1,137	1,654	1,137
RFA	0	274	274	5,097	274
Close or RFA	0	14,538	15,673	2,446	14,538
Close	3,268	4,570	3,289	17,087	4,570

Alternative 1 (closely followed by Alternatives 2 and 3) results in the largest number of acres and AUMs remaining available for livestock grazing, while Alternative 4 results in the lowest, about 85 percent less than Alternative 1. The potential contribution to local livestock sales is correspondingly greatest in Alternative 1 and least in Alternative 4.

The potential long-term effects of anticipated forage reductions on individual lessees would be lowest in Alternatives 1 and highest in Alternative 4. Conflicts between livestock grazing and other uses on public and adjacent private land are less likely in Alternative 4, which has the fewest acres open to grazing. Alternatives 1, 2, and 3 are likely to have conflict levels somewhat higher than those expected for Alternative 4, but lower than those expected for the other alternatives.

Effects of the Alternatives on Livestock Grazing

Analyses described herein focus only on actions where there is a measurable environmental consequence. Actions for the following resources and uses will have no measurable effect on livestock grazing: Soils, Wildlife, Wild Horses, Wilderness Characteristics, Cave Resources, Visual Resources, Special Designations, Native American Uses, Paleontological Resources, Cultural Resources, Recreation Opportunities, Commercial Recreation Uses, and Lands and Realty at the planning scale.

Actions for the following resources and uses will have no effect on livestock grazing if associated assumptions are correct:

- 1 Air quality - restrictions on operations, such as prescribed fire, are assumed to have no affect on vegetation treatment size, frequency, or the amount of rest required before or after such treatment.
- 1 Water Quantity, Quality and Fish - meeting aquatic resources goals is assumed to be achievable through modifying grazing practices (for example, accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing) and will not require a measurable loss of permitted use.
- 1 OHV and Travel Management - management will not open or close public access to any range allotment and is therefore assumed to have no impact on the grazing matrix or permitted use.
- 1 Special Designations - The potential for changes in grazing systems and seasons of use exist, but most necessary changes to livestock management have already been implemented and no major future actions would be anticipated.
- 1 Energy and Minerals - land allocations to energy and mineral related activities are assumed to exclude grazing from a small enough acreage to have no measurable impact to permitted use.

Vegetation, Fuels and Fire Management Effects on Livestock Grazing

Under Alternative 1, an estimated 2,300 acres would be rested each year to prepare for a prescribed burn. In addition, 3,600 acres would begin the first of two years of rehabilitation each year. That would translate to approximately 1,900 AUMs being taken out of production each year, or 6.2% of the AUMs on public lands in the John Day Basin. The use of prescribed fire and rehabilitation of wild land fire could result in a long-term increase in forage quality and quantity after these sites recover. However, this increase would normally be allocated to improving ecosystem function and not to permanent increases in the amount of permitted use. Fire would cause a decrease in forage available for livestock use in the short term, requiring changes in livestock grazing use. Short-term impacts of emergency fire rehabilitation include grazing exclusion following the rehabilitation.

Under Alternatives 2-5, 2,300 acres would be rested each year to prepare for a prescribed burn. However, 4400 acres would begin the first of two years of rehabilitation. Additionally, an estimated 1,500 acres would receive ‘appropriate management response’ treatment each year. That would translate to approximately 2,820 AUMs being taken out of production each year, or 9.3% of the AUMs on public land in the John Day Basin. This is 33% greater than Alternative 1.

Agricultural Land Management Effects on Livestock Grazing

An estimated 700 acres of irrigated agricultural fields have been or will be converted under current management direction (Alternative 1). So far, 0 AUMs have been added to livestock grazing leases. However, were application for grazing to be made, the potential exists for an additional 100 AUMs of preference to be allotted.

Under Alternatives 2-5, an estimated 1,175 acres of irrigated agricultural fields remain under production. If all were to be converted to native vegetation and applications for grazing all were to be made, the potential exists for an additional 168 AUMs of preference to be allotted.

Recreation

Introduction

Analysis of the consequences of the alternatives on recreation opportunities considered the following key resources or resource uses; Recreation Management, Cultural Resources, Energy, Minerals, Visual Resources, Travel Management, Special Designations, Aquatic Resources, Wildlife, and Vegetation Management

Recreation Indicators

- **Quality of Recreational Opportunities.** The quality of recreational opportunities indicates variations in the duration of recreation, frequency of recreation and the recreationists' level of satisfaction with recreation. The level of satisfaction is frequently related to the level of conflict between recreationists and other users. Users expect to have an enjoyable time and avoid conflict with other users. Increasing visual quality of landscapes frequently increases the quality of recreational opportunities as well.
- **Quantity of Recreational Opportunities.** The amount of areas and levels of access provided for recreational opportunities is an indicator of how management effects recreation. 1
- **User Displacement.** Displaced users indicate short or long term loss of recreation opportunities. Generally, displaced users indicate loss of choices in location for recreationists. 1

Recreation Assumptions

- 1 The action alternatives would help meet future demand for regional motorized, non-motorized and river-based recreation activities and improve the quality of most visitor experiences on public lands in the plan area.
- 1 Most recreationist enjoy natural landscapes.
- 1 Public lands classified as Middle Country (see Tables 2-12 and 2-25) may have trails only for non-motorized use.
- 1 Visitor demand for all types of recreation opportunities will increase annually, with most visitor demand being for river-based and motorized recreation opportunities.
- 1 Motorized use in WSAs is limited to designated routes, or may be closed to motorized use to protect wilderness values.
- 1 OHV use is limited in the action alternatives to designated routes and trails, unless otherwise noted (Executive Orders 11644 (37FR2877) and 11989).
- 1 Not all public land can be legally accessed by the public (i.e., Federal lands that are land locked by private land owners without any public access routes or easements).
- 1 Routes with only administrative easements across private are closed to public access.
- 1 Rights-of-way (ROW) and public easements open for public use may have seasonal use restrictions.
- 1 To the extent possible, BLM will utilize existing interim routes and will only build new route or trail connections if necessary to provide a variety of motorized and non-motorized designated route or trail loops as part of the Transportation Management Plan (to be completed 5 years following the ROD).

- 1 BLM would enforce the 2007 43 CFR 8343.1 - Vehicle Operation Standards (October 1, 2007 edition, pg. 946) for OHV use on public land that identifies sound, spark arrestor, light, brake and other requirements for use of OHVs on public land.
- 1 Sounds from Class I, II, or III (see glossary) OHV use on public land would not exceed the Oregon state 99 decibel (db) limit, and hence not be intrusive.
- 1 Sound from OHV use may be heard at different levels by other recreation visitors, adjacent landowners, permittees, mining claimants, other users, or wildlife. Sound from OHV use is variable and dependent upon, but not limited to type of OHV, riding or driving style of the OHV user, time of day, wind velocity and direction, topographic and vegetative screening, elevation, aspect, temperature, and other factors. Sound from OHV use would not be intrusive to local land owners under action alternatives because these alternatives proposed locate OHV use away from BLM and private land boundaries.

Table 4-20 is a plan area wide summary of alternative effects on motorized and non-motorized recreation opportunities and development on all public lands except Little Canyon Mountain. Table 4-21 is a Little Canyon Mountain summary of alternative effects regarding motorized and non-motorized opportunities and development, and Table 4-23 summarizes all recreation effects in general. Effects of the alternatives on Recreation Permitting are addressed in a separate, subsequent section.

Effects Common to All Alternatives

Recreation Management Effects on Recreation Opportunities

BLM would continue to manage river use in all John Day River segments according to the 2001 BLM Record of Decision for the John Day Wild and Scenic River Management Plan.

Upland recreation opportunities within the John Day River canyon area would continue to provide quality hiking, hunting, photography, back country navigation opportunities. The quality of these river based recreation opportunities would be the same under all alternatives.

All alternatives would carry forward the existing developments on BLM managed lands. Existing developments along the main-stem of the John Day River would continue to support river and land-based recreation use on BLM lands and would continue to be governed by the John Day Wild and Scenic River Management Plan. These existing developments would continue to support existing and future river recreation use, enhancing water-based and upland recreation opportunities within this river corridor. Motorized public access to public lands in the lower John Day area would continue to be restricted. No motorized recreation opportunities exist in this area, because public lands are not accessible to the public, except seasonally limited motorized boat use in segments of the John Day River.

Table 4-19. Number of days sound from Off-Highway Vehicle Use could be heard on public land from Little Canyon Mountain area. 1

Action	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
On motorized use trails in central portion of LCM	365	365	365	209	209
On OHV trails in Buffer Areas	365	365	365	365	365
North OHV Pit	365	0	365	0	0
South OHV Pit	365	365	365	365	0

Sound from any kind of OHV use in the Little Canyon Mountain area has occurred for decades due to historic motorcycle, all-terrain vehicle (ATV) and vehicle use. Sound from motorcycle, ATV, or vehicle motors results from OHV users riding up or down the slopes of Little Canyon Mountain, or riding in the North and/or South Pit areas, climbing steep hill sides that define these OHV play areas.

The effects of OHV sound vary as widely as the type of OHVs that make the sound. Most, if not all OHV users may not readily hear sound from other OHV users; they probably wouldn't even hear other OHV sound because they are focused on their OHV riding and sounds from their OHV likely prevents sound from any other OHV being heard.

Other recreation visitors such as horseback riders, hikers, or mountain bike users in the vicinity could hear OHV sound and may choose to recreate in the same area, or go elsewhere. Existing mountain bike trails are adjacent to OHV use trails, particularly in the upper elevations. No known conflicts between OHV and mountain bike use are known to occur on Little Canyon Mountain.

Adjacent landowners are expected to be affected by OHV sound differently than other stakeholders. Long or short term residents adjacent to public lands on Little Canyon Mountain experience sound from OHV use from short periods of time to decades, depending on their length of residence. Some adjacent landowners may find the sound from OHV use to be irritating, while other landowners may not. Some landowners may own some type of OHV and ride on Little Canyon Mountain and other landowners may have non-motorized recreation preferences. Typically, if landowners ride any type of OHV, the potential for finding sound from OHV use irritating might be less than landowners who do not recreate using OHVs.

Air Quality Effects on Recreation

Air quality restrictions are not expected to limit motorized or non-motorized recreation use throughout the plan area due to low levels of motorized use and low dust production that would not exceed air quality restrictions. Under all alternatives, areas designated as Open for OHV use have the highest risk of limiting recreation opportunities due to air quality regulation enforcement.

Cultural Resources Effects on Recreation

In areas where site specific monitoring reveals cultural resource concerns, primitive road or trail construction for recreation use and road or trail rehabilitation and maintenance activities may be restricted, closed to motorized and non-non-motorized use, or mitigation measures applied to limit effects of these activities on cultural resources under any alternative. Restricting or closing trails or routes would reduce motorized and non-motorized recreation opportunities where these restrictions are implemented.

Energy and Mineral Resources Effects on Recreation

Areas developed for potential energy purposes decrease user satisfaction on existing and user-created trails or routes (Alternative 1), or designated motorized or non-motorized recreation routes or trails (Alternatives 2-5). This is due to the short term potential for site reduction in access to provide safe access for specific energy and mineral uses. Long term mitigation measures would resolve any potential conflicts, such as relocating existing or user created (Alternative 1), or designated motorized or non-motorized recreation primitive routes or trails (Alternatives 2-5) around the energy or mineral resource and associated roads. The effects of trail or route re-location would be similar between all alternatives.

Fire and Fuels Management Effects on Recreation

Burned vegetation from prescribed burns or wildfires may lead to temporary closures, preventing motorized and non-motorized recreation visitors from traveling off designated routes or trails and provide time for re-vegetation to occur. Short-term route or trail closures would displace hunters using Class I, II and III OHVs to other hunting areas. Routes heavily used by fire equipment may be temporarily damaged. However, fire rehabilitation efforts would be required to correct damaged roadbeds. Fire dozer lines may limit trail or route use by impacting primitive routes or trails used by motorized and non-motorized users, unless damaged routes and trails are re-built at the time by fire incident personnel.

Over the long-term, revegetation would occur and provide visual barriers that keep visitors on designated routes or trails by limiting the sight distance of a route or trail through vegetation.

Providing prompt rehabilitation from fire management activities would minimize long-term loss of motorized or non-motorized routes or trails resulting from fire management activities. Game hunting opportunities are expected to increase after 2-3 years, with new vegetation forage attracting game animals to burned locations.

Grazing Management Effects on Recreation

Motorized recreation use would not be restricted by grazing management in OHV Open Areas due to a recreation BMP and guidelines that would not allow any net increase in livestock fencing in open areas. In Limited areas, motorized and non-motorized recreation use may be confined by livestock fenced areas, unless gates and/or cattleguards are installed to allow recreation access between livestock pastures and allotments. If no cattleguards are installed, motorized and non–motorized use would be confined to areas without fences. Confining recreationists might reduce the quantity of recreation opportunities.

Lands and Realty Effects on Recreation

Acquisition or exchanges of other lands to block up BLM public lands would enhance existing visual quality of public lands. Over the long term, land acquisition of lands to block up existing public land ownership patterns enhance visual quality and provides stable land uses that trend toward enhancement of visual quality on landscapes.

Visual qualities would be retained on public lands zoned Z-1 along the main stem John Day River, the South and North Forks of the John Day River, Dixie Creek and Little Canyon Mountain areas, Rudio Mountain and Johnson Heights and public lands surrounding Sutton Mountain. All of the action alternatives have the largest acreage of public lands retained for future management and use, totaling 363, 095 acres. There is 70% more public lands zoned Z-1under all of the action alternatives than public lands zoned Z-1 under Alternative 1 (Table 2-25).

A greater number of acres would be zoned Z-3 under Alternatives 2-5 than Alternative 1, so visual qualities may be reduced on these tracts of public land. Alternatives 2-5 have the highest potential for loss of open space through potential disposal of 72, 454 acres of Z-3 public lands, compared with 40,444 acres zoned Z-3 under Alternative 1, an increase of 79% more public lands available for disposal than Alternative 1.

Generally, land tenure adjustments that block up public lands and improve public access would enhance river-based, motorized and non-motorized recreation use opportunities. In addition, ROWs which consider increasing public access would increase the mileage of routes available and increase the quality of recreation opportunities.

The potential loss of BLM public lands with a Zone 3 classification for disposal or sale could eliminate potential OHV Class II technical rock crawling opportunities on public lands north of Highway 19 between Kimberly and Service Creek. Primitive elk and deer hunting opportunities may be lost in the Johnson Heights area and the Rock Creek area east of Condon, if exchanged. Recreation and Public Purposes (R&PP) leases on lands near municipalities may decrease or increase motorized or non-motorized recreation opportunities, depending on the type of R&PP lease.

Soils Effects on Recreation

Soils management BMPs under all alternatives may reduce some opportunities for designated OHV Class I, III trails and Class II routes in riparian areas. Recreation sites for OHV visitors to camp and use during the day may also be limited to designated sites. Restrictions on route or trail slope may limit or prohibit routes or trails designed for more or most difficult motorized and non-motorized trail users, unless mitigations for preventing soil erosion are part of the designated motorized or non-motorized trail system.

Vegetation Management Effects on Recreation

Timber hauling activities and other treatments under all alternatives could reduce both motorized and non-motorized recreation opportunities by causing short-term route or trail closure, and short-term damage or additional maintenance to routes or trails used by motorized and non-motorized recreation users. These treatments may also impact visitor experiences and remoteness by altering the landscape.

In the short term, changes in acres transitioning from woodland to open areas under all alternatives may also increase difficulty of keeping motorized and non-motorized recreation visitors on designated routes and trails. In the long-term, proactive forest and woodland management is expected to increase the quality of recreation experiences in aesthetically pleasing, diverse vegetative landscapes that are less vulnerable to catastrophic wildfires.

However, the lack of proactive forest and woodland management on forested or woodland landscapes under all alternatives would reduce the quality of recreation opportunities by contributing to the potential for catastrophic wildfire events. Catastrophic wildfires that alter and replace vegetative stands would leave a more barren landscape with less visual appeal to public land users, tourists, and local residents.

Weed management guidelines do not differ between alternatives and are not expected to affect non-motorized use, but would affect motorized use in areas having high concentrations of noxious weeds, where motorized use would be prohibited off designated routes. Some entire areas may be closed to motorized use to prevent the spread of noxious weeds until the weeds are eradicated, such as the 598 - acre Golden Triangle OHV Open Area.

Successful weed treatment over the long-term is not expected to affect recreation or cross-country OHV use. When constructing routes or trails, mitigation measures targeting weed prevention would be applied to equipment utilized for maintenance, rehabilitation and construction activities.

Visual Resource Management Effects on Recreation

VRM guidelines are expected to enhance motorized and non-motorized recreation route and trail opportunities and contribute to providing quality experiences in a landscape by retaining existing visual quality. Some routes or trails may be relocated or designed to meet appropriate VRM guidelines, helping to ensure landscapes and route or trail systems are aesthetically pleasing to all types of recreation visitors.

Wilderness Study Area (WSA) Effects on Recreation

Opportunities for non-motorized use would continue to be available in all WSAs and areas having Wilderness Characteristics. These areas would provide diverse, non-motorized recreation opportunities such as rafting, canoeing, big game hunting, wildlife viewing, and photography.

Opportunities for motorized activities are not available in the lower John Day, Spring Basin and Pat's Cabin WSAs. The Sutton Mountain WSA only has approximately 2 miles of designated routes open to motorized use, so motorized opportunities are very limited.

Areas having Wilderness Characteristics, totaling 11,929 acres under the action alternatives would provide upland non-motorized recreation opportunities. However, currently there are no existing motorized roads or trails on these public lands.

Effects Common to the Action Alternatives

Tables 4-19, 4-20 and 4-21 summarize relative differences in effects of the alternatives on recreation opportunities. The following sections describe the effects that are common across the action alternatives, and then effects by alternative where they differ.

Recreation Management Effects on Recreation Opportunities

With implementation of Benefits Based Recreation criteria, the level and type of access available for public use would vary, based on the setting for five Special Recreation Management Areas. Under the Action Alternatives, 293,397 acres of public lands encompassing 64 percent of public lands in the plan area would be designated as Special Recreation Management Areas (SRMAs) and managed for specific motorized and non-motorized recreation opportunities or experiences. This action would result in more locations and acres available for visitors than under Alternative 1 for motorized or non-motorized trails. Alternative 1 has only one SRMA (associated with the Wild and Scenic Rivers). Alternatives 2-5 contain 5 SRMAs and increases the quantity of recreation opportunities more than Alternative 1.

Alternative 1 does not offer conflict resolution criteria. The action alternatives use the Benefits Based Recreation Criteria and other guidelines to reduce user conflict.

A variety of designated routes and trails enhance the quality of visitor opportunities and experiences and also help meet future demand for non-motorized and motorized use over the long term. Designated routes and trails would be developed to help reduce user conflicts, through separation of motorized and non-motorized uses in some areas and provide separate and combined use on designated routes and trails in other areas (see Appendix K for a recreation opportunity, setting and marketing summary of proposed SRMA and ERMAs).

Motorized opportunities would be enhanced for most Class I, II and III OHV users, due to designated Class I and III trails and OHV Class II routes being allowed and managed for on public lands classified as Middle Country, Front Country, or Rural. These three recreation settings allow for motorized and non-motorized access and would provide diverse motorized and non-motorized trail and route opportunities. However, under the action alternatives opportunities for cross-country OHV use would not be available on all public lands except for the small OHV Class II Play Area at Little Canyon Mountain. Motorized horn hunting and back-country cross-country exploration opportunities would be lost.

Not every trail would be shared-use, so motorized opportunities would be lost under the action alternatives in some areas limited only for non-motorized or motorized use. Some areas may only have non-motorized trails, while other areas would have shared-use trails. If conflicts arise, the route may be limited to either motorized or non-motorized use, at the discretion of the Authorized Officer, resulting in lost recreation opportunities for either motorized or non-motorized visitors.

No motorized recreation opportunities exist under the action alternatives in areas having Wilderness Characteristics, encompassing 11,929 acres. These lands do not have primitive routes, so there would be no effects to motorized users.

Table 4-19 shows that sound from OHV use would be reduced under any action alternative, relative to the no action alternative (alternative 1), due to time of day, day of week, and/or seasonal OHV restrictions. The cumulative effect of these restrictions on OHV use would result in a notable reduction in OHV sound, due to reduced OHV use under any all action alternative, especially Alternatives 4 and 5. Under Alternative 1, OHV sounds would be more frequent and apparent compared with sounds from OHV use under all of the action alternatives.

Under any action alternative, designated routes and trails would be developed to help reduce user conflicts, separate motorized and non-motorized uses in some areas and provide separate and combined use on designated routes and trails in other areas. Designated routes located away from public and private land boundaries and a reduced number of designated motorized trails would reduce sounds from OHV use, particularly in Alternatives 2-5. No sound from OHVs would be heard when OHV use is not allowed in the OHV pit areas under Alternative 5.

Sounds from OHV use would be less under all of the action alternatives, due to eliminating motorcycle or vehicle use, or prohibited OHV use in the OHV North and South Pit areas, depending on the action alternative.

Non-motorized recreation visitors may find other locations to recreate, if competition occurs to ride or use the same trail, or if sounds from OHV use intrude on the quality of the desired non-motorized recreation experience. Hikers and horse back riders may also be displaced if no designated trails exist for their preferred use, or if OHV use and OHV sound increase in the future.

Conflicts between motorized and non-motorized users would occur in big game hunting areas such as the North Fork John Day River, resulting in lower quality recreation experiences. These conflicts would occur under all alternatives, but would be reduced under the action alternatives by managing motorized and non-motorized use.

Less potential exists for conflicts and trespass are expected to occur under the action alternatives, than Alternative 1, due to OHV use restrictions limiting motorized use to designated routes and trails only on BLM lands or lands BLM has obtained a Right-of-Way for this use.

SRMA and Recreation Facilities Effects on Recreation Opportunities

Expanding and designating additions to the existing John Day River Special Recreation Management Area (SRMA), and also new SRMA designation of the Little Canyon Mountain, Bridge Creek, North Fork and South Fork of the John Day River areas under the action alternatives would provide increased water-based, motorized and non-motorized management emphasis on 293,397acres, encompassing 64% of public lands in the plan area.

The existing Special Recreation Management Area (SRMA) designation of the John Day Wild and Scenic River area would continue to provide quality motorized and non-motorized recreation opportunities. Recreation facilities along the John Day Wild and Scenic River would continue to be upgraded to protect resources. A new semi-primitive campground may be developed on the south side of the John Day River, at Priest Hole, north of Mitchell and possibly a semi-primitive campground on the South Fork John Day River. Conditions for development are contained in the John Day Wild and Scenic River Management Plan. These developments would provide more desirable locations for camping and day-use. Up to two semi-primitive campgrounds may also be developed on the North Fork John Day River, providing additional camping and day-use opportunities in this area. The seasonal use restriction from April 15th through November 30th, annually would not affect most visitors.

Under the action alternatives, the quality of recreation opportunities and experiences would be higher for all recreation opportunities, compared to Alternative 1, which focuses management on water based opportunities, WSA management and LCM interim management.

Designation of the 59,163 acre Rudio Mountain/Johnson Heights and 2,516 acre Dixie Creek Extensive Recreation Management Areas (ERMAs) under Alternatives 2-5 would result in higher quality motorized and non-motorized activities by increasing resource protection, public safety and reducing user/landowner conflicts in those areas over the No Action Alternative (See Appendix K for additional SRMA and ERMA information).

Designated motorized and non-motorized trail riding opportunities would be provided on public lands designated for motorized use under Alternatives 2-5. These SRMA designations would increase opportunities over the long-term compared to Alternative 1 by facilitating increased funding for motorized routes and trails and non-motorized trails. Public access to public lands in the Bridge Creek and Lower John Day River areas would continue to be very restricted, so very limited motorized recreation opportunities would exist in these areas under all alternatives.

Under Alternatives 2-5, prohibiting cross-country OHV use in the John Day riverbed during low flows would displace OHV users driving in the John Day River when low flows occur. However, visitor management and resource values would benefit from this OHV closure. Existing recreation facilities under all alternatives have no effect on existing OHV use.

Non-Motorized Recreation Opportunities

Under the action alternatives, 134,678 acres (Primitive and Back Country) would be designated for non-motorized recreation opportunities. Under Alternative 1, no acres would be designated Primitive and Back-Country. This separation of motorized and non-motorized use under the action alternatives in some areas would reduce encounters between motorized and non-motorized visitors, improving non-motorized recreation experiences in the North and South Forks of the John Day River, Bridge Creek and Lower John Day SRMAs. The remaining public lands limited to designated routes and trails would result in more opportunities than under Alternative 1 for non-motorized visitors seeking recreation opportunities away from designated OHV routes or trails.

Opportunities to develop non-motorized trails under the action alternatives would increase recreation opportunities for those visitors looking for hiking, mountain bike or horse back riding trails not open to OHV use. Opportunities for non-motorized trail systems would be most desirable to non-motorized users in the North and South Forks of the John Day River, Little Canyon Mountain, Rudio Mountain, Johnson Heights and Dixie Creek areas. Additional public lands for non-motorized recreation opportunities would be increased by seasonal motorized closures, motorized recreation closure areas, and road density limitations that restrict motorized use to designated routes and trails, or close some public lands to seasonal or year-round motorized use.

Travel Management Effects on Recreation

A wide range of quality non-motorized and motorized recreation opportunities will result from the interim and final transportation system under the action alternatives. This travel management system would provide more diversity and benefits than the No Action Alternative by including designated non-motorized trails, as well as designated routes and trails for motorized Class I, II and III OHV use that would be managed and maintained to provide public access and different levels of difficulty for different recreation activities.

The effects of limiting motorized recreation use to designated routes under the action alternatives, rather than allowing seasonal cross-country use, is expected to affect many motorized recreation visitors that have historically traveled cross-country for back-country exploration, such as horn hunters and big game hunters who use their Class I, II, and III OHVs during hunting seasons. Limiting motorized recreation hunters to designated routes and trails is expected to result in some hunters continuing to drive cross-country, creating more routes and trails to get to their hunting location, or retrieve big game, especially in the North Fork John Day and Rudio Mountain areas. Unauthorized motorized recreation use off designated routes will make it difficult for BLM to restrict motorized use to designated routes and trails and cost additional funds to rehabilitate unauthorized routes or trails.

However, limiting motorized recreation hunters to designated routes and trails on all other public lands under the action alternatives is expected to better enhance recreation opportunities for non-motorized recreation users who prefer or require quiet public lands to pursue their recreation activity compared to Alternative 1. Limiting all motorized use to designated routes and trails is also expected to provide additional unroaded big game habitat than the existing situation, resulting in a more big game to hunt and higher quality recreation experiences in the long term.

Special Designations Effects on Recreation

Under all of the action alternatives, motorized and non-motorized use would not be affected by existing or proposed special designations. Class I, II, and III OHV riding or driving opportunities in areas proposed to be designated as ACECs either currently don't exist, or are very limited. All motorized use within Wild and Scenic River corridors would be limited to designated routes.

Most motorized use occurs outside WSAs, except for two vehicle routes in the Sutton Mountain and Aldrich Mountain WSAs, so no new effects to motorized use would occur under any alternative. Motorized recreation use in ACECs would be limited to designated routes, so no effects to motorized use would result from ACEC designation. Under any alternative, non-motorized recreation opportunities would continue to be more available in special designated areas closed to motorized use.

Back Country Byways Effects on Recreation

Continued opportunities for driving for pleasure, wildlife and nature study, photography and other recreation opportunities would be available by management of the existing South Fork John Day River Back Country Byway; a 50 mile byway paralleling the South Fork of the John Day River. Designation of the 41 mile Sutton Mountain Road as a BLM Back Country Byway or State Scenic Byway under the action alternatives would provide additional roadside viewing opportunities along the designated route circling the Sutton Mountain WSA compared to Alternative 1.

Aquatic and Riparian Management Effects on Recreation

The Aquatic Conservation Strategy and riparian BMPs of Alternatives 2-5 may restrict, or prohibit motorized and non-motorized use, and vehicle routes in riparian areas. These restrictions would be due to water quality, soil erosion, sedimentation, and aquatic concerns. Road construction and maintenance for motorized and non-motorized trails and routes may be limited, or may require additional costs over those needed to implement Alternative 1 to meet aquatic and riparian BMPs. These management guidelines may include altering or closing stream crossings and habitat restoration.

Motorized recreation use may be temporarily or permanently affected by seasonal or year-round road or trail closures in all alternatives. Most motorized recreation use is in riparian areas along the North and South Forks

of the John Day Rivers and in locations along the main-stem of the John Day River by visitors camping near these areas to camp, fish, hunt, raft, and sightsee. Re-routes to prevent motorized use in creeks would not affect motorized users. However, route closures without alternative routes would displace motorized use in these areas and opportunities to connect to other primitive routes may not occur, resulting in lost motorized opportunities in these situations.

Wildlife Management Effects on Recreation

Proposed wildlife seasonal closures would limit motorized use on 86,793 and 332, 995 acres of public lands, from April 15th through November 30th, annually under Alternatives 2-5 and Alternative 1 respectively. Greater seasonal closure under all of the action alternatives would affect 73% of public lands in the plan area. More seasonal motorized use restrictions under the action alternatives would eliminate year-round motorized use opportunities on more acres of public land than Alternative 1.

More year-round motorized opportunities would be lost under all of the action alternatives than Alternative 1; however, a large portion of these public lands are not accessible to the public due to no legal access, or deep snow or wet soil conditions during the winter.

Opportunities for wildlife viewing and other non-motorized recreation opportunities may be enhanced by greater seasonal motorized closures under Alternatives 2-5 than Alternative 1, resulting in fewer wildlife-OHV encounters.

Road density limits under the action alternatives apply to all roads across public lands (including State, County, and local routes). The effects of implementing road density limits are the same for the action alternatives, although they vary from 326,518 acres affected under Alternative 2; 325,918 acres under Alternative 3; 331,005 acres under Alternatives 4; and 331,007 acres under Alternative 5.

The mileage of BLM roads available for motorized recreation use under Alternatives 2-5 would be less than motorized recreation opportunities under Alternative 1 (See Transportation Effects for more details). Current road densities are the highest in Upper John Day and North Fork John Day Areas. Actual identification of roads to be closed to motorized use would be determined as part of the transportation management plan. However, this potential road reduction may, or may not reduce motorized recreation opportunities in these areas.

Motorized game retrieval restrictions for the action alternatives would require more law enforcement time to enforce, costing more to enforce than Alternative 1, not having these restrictions.

Table 4-20. Comparison of the Effects of Management Alternatives on Motorized and Non-motorized Recreation Opportunities and Development on BLM lands in the John Day River Basin plan area.

	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3	Alternative 4	Alternative 5
Managed Recreation Settings; Primitive; Back-Country; Middle-Country; Front Country; Rural	River based Recreation only through John Day WSR Plan. WSA; Primitive; No other managed setting	River: same as Alt.1. Uplands managed for motorized and/ or non-motorized opportunities	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
River Opportunities	Managed under the John Day WSR Plan	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Non-Motorized Opportunities	Managed opportunities in WSA's only	More opportunities than Alternative 1	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
Cross-Country OHV Opportunities	Greatest opportunities	Less than Alt. 1 & 3; more than 4 & 5.	Less than Alt. 1; more than 2, 4, 5.	Less than Alt. 1, 2, 3; no OHV Open Areas	Same as Alternative 4
Designated Route and Trail OHV Opportunities	Fewest opportunities. Users create routes & trails	More than Alt. 1, 4, 5 & less than Alt. 3	Most opportunities of any alternative	Less than Alternative 3 & 2, but more than 1.	Same as Alternative 4
Seasonal Motorized Restrictions	Smallest acreage and number of areas	More acreage and number of areas than Alt. 1	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
Road Density Restrictions	None	May restrict motorized use. Exact location and mileage TBD in TMP.	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
OHV Open Area	Most acreage Open	Less Acreage Open than Alt. 1. 4,488 acre Rudio Plateau Open.	Same as Alternative 2, except 598 acre Golden Triangle Open year-round.	2 acres Open.	No OHV Open.
Class II Rock Crawl Area	User Created	Designated Area(s)	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
Game Retrieval	Allowed where motorized use is authorized in Open Areas	Allowed on designated routes only. Cross-country use prohibited except seasonally on Rudio Mountain Plateau	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
Resource Constraints	Less than Alternatives 2, 3, 4, 5	More than Alternative 1	Same as Alternative 2	Same as Alternative 2	Same as Alternative2
SRMA/ERMA Designations and Recreation Development	1 SRMA; 1 ERMA	5 SRMAs; 3 ERMAs	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2

Table 4-21. Summary of Effects of Management Alternatives on Motorized and Non-Motorized Opportunities and Development in Little Canyon Mountain SRMA.

Effects of each action on OHV and Non-motorized opportunities are in *italics*.

	Alternative 1 – Existing	Alternative 2 – Preferred	Alternative 3	Alternative 4	Alternative 5
Recreation Trail Opportunities OHV Trail System; OHV Class I, II, and III and non-motorized use	LUP: Open, Interim: Mixed; *Fewer opportunities for motorized use, due to some OHV trail allocation to non-motorized users.*	Mixed; *Same effects as Alternative 1.*	Mixed; *Same effects as Alternative 1.*	Mixed; *Same effects as Alternative 1.*	Limited; *Same effects as Alternative 1.*
Daily and Weekly OHV Riding Opportunities	Open 24 hour/day; *Most OHV riding time of all alternatives; no time or day constraints.*	Use limited to 9 am to 6 PM; *OHV riding opportunities reduced to specific hours of the day; no constraints on OHV riding opportunities during day of week.*	Use limited to 9 am to dusk; *Same effects as Alternative 2.*	Use limited to 9 am to 6 PM Mon, Wed, Fri, Sat; *Fewest OHV riding opportunities due to reduced to specific hours of the day and specific days of week. Fewest OHV riding opportunities on a daily and weekly basis*	Use limited to 9 am to 6 PM Mon, Wed, Fri, Sat; *Same effects as Alternative 4.*
Class I, II, and III OHV Play Opportunities	**Play Areas:** N. Pit. Open to Class I and Class III OHV; *No Class II opportunities.* S. Pit. open to all OHV; *Most OHV riding opportunities of all alternatives.*	**Play Areas:** N. Pit. Utilize as parking area and trail head; *No Class I, II and III riding opportunities in this pit.* S. Pit. open to Class II OHV; *No Class I or III riding opportunities.*	**Play Areas:** N. Pit. Same as existing. S Pit. Same as existing. *Same effects as Alternative 1.*	**Play Areas:** N. Pit. Closed; *No Class I, II, or III riding opportunities.* S. Pit. Same as existing; *Same effects as existing alternative.*	**Play Areas:** Closed; *Most restrictive of all alternatives on OHV Play. All OHV Play opportunities lost.*

Table 4-21 (cont.).

	Alternative 1 – Existing	Alternative 2 – Preferred	Alternative 3	Alternative 4	Alternative 5
General Opportunities	Open; *More OHV cross-country riding opportunities available than all other alternatives.*	Limited to designated roads and trails; *Fewer OHV riding opportunities due to being restricted to designated routes and trails. May be opportunities for technical OHV trails and routes, due to managed and designed OHV trail and route system.*	Limited to designated roads and trails. *Same effects as Alternative 2.*	Limited to Class 1 and 2 Limited to reduced number of roads and trails open to motorized travel. Upper trails subject to seasonal closure. *Fewest OHV riding opportunities, due to being restricted to designated routes and trails and seasonal use.*	Limited to reduced number of designated roads and trails. Upper tails subject to seasonal closure; *Same as Alternative 4.*

Analysis of Alternative 1

Non-Motorized Recreation Opportunities

Under Alternative 1, the entire plan area would continue to be available for non-motorized recreations activities. However, most public lands would also be available for both motorized and non-motorized use. Shared use routes and trails would not be designated or managed for specific recreation opportunities and experiences, resulting in limited compatibility and lower quality recreation experiences in the short- and long- term than any action alternative.

Reduced visitor satisfaction would continue to result from non-motorized visitors seeking more quiet recreation opportunities in the same area used by motorized users. This conflict between motorized and non-motorized uses would continue to be most apparent in the North and South Forks of the John Day River, Little Canyon Mountain, Rudio Mountain and Dixie Creek areas.

The existing Wilderness Study Areas would continue to provide non-motorized opportunities for such activities as hiking, hunting and horseback riding. Under current management, the remaining public lands in the plan area would not be managed for specific recreation opportunities or experiences, resulting in a mix of outcomes and varying user conflicts. The fewest opportunities for non-motorized recreation opportunities would be available under this alternative.

Motorized Recreation Opportunities

Under Alternative 1, the greatest amount of public lands would be open for cross-country Off-Highway Vehicle (OHV) use. This alternative would provide the most opportunities for driving across 258,064 acres of public lands and driving on or off existing routes for recreation activities such as horn hunting, back-country exploration, hunting and rock collecting. This acreage encompasses 57% of public lands in the plan area. Opportunities for Class I, III OHV trails, or Class II routes or technical rock crawling areas would continue to be limited, but would still available to local OHV users who know places to ride or rock crawl. These opportunities would not be provided through an OHV designated trail or route system.

Under Alternative 1, opportunities for a loop trail riding or driving experience, or technical rock crawling experiences would be limited to OHV users creating their own trails or routes. Year-round dispersed OHV use under Alternative 1 would continue to occur on the most public land acreage of any alternative. In the short term, conflicts between motorized and non-motorized users would be least under Alternative1, due to the greatest amount of public land being available for cross-country motorized use, with the highest potential to avoid conflicts with non-motorized users by riding somewhere else and not being restricted to designated routes or trails.

However, in the long term under Alternative 1, as visitor use increases, conflicts between motorized and non-motorized visitors are expected to increase in popular motorized and non-motorized use areas, resulting in lower quality recreation experiences for non-motorized and motorized visitors. User conflicts would continue to increase over the long term, without a recreation setting established, and no management controls to separate uses to provide quality recreation opportunities and experiences.

Road Density

No motorized road density limits would exist under Alternative 1. OHV use would not be restricted by potential road density restrictions on 456,610 acres of public land, or 100% of public lands in the plan area. Potential trespass on adjacent private land and potential conflicts with adjacent landowners would be highest under this alternative. Designated routes and trails would not be identified, or signed, resulting in OHV users traveling on routes or trails that may be located on private land. Lack of (see below and Table 4-13) road density restrictions may result in displacing wildlife in highly roaded areas, thus reducing game hunting opportunities in those areas.

OHV Play Areas

Besides the Little Canyon Mountain (LCM) OHV Area, no additional OHV Play Areas or OHV Trail or route systems would be designated under Alternative 1. Over time, more OHV play areas may be created by riders in

other locations on public land outsideof LCM, due to the large amount of public lands classified as Open. These activities may result in resource and visitor conflicts, as well as potential conflicts with adjacent private landowners.

Little Canyon Mountain

In the Little Canyon Mountain area, OHV opportunities for Class I and III trail riding and Class II driving would continue in Alternative 1 with the least restrictions of any alternative (Table 4-21). Opportunities for OHV use would continue to be available with no time of day, day of week or monthly restrictions. Motor or engine noises from OHV use, referred to as decimal sounds, would continue day or night and may result in the highest potential for conflicts with adjacent landowners and other non-motorized users who find these sounds objectionable. Limited enforcement of decimal sound limits would continue.

Potential trespass on adjacent private land next to public lands in the Little Canyon Mountain area and potential conflicts with these private landowners would be highest under this alternative. Designated routes or trail signing would be limited. Limited trail and public land signing would result in OHV users traveling on routes or trails that are user-created. Some existing trails or routes may be located on private land, resulting in conflicts with adjacent private landowners, until these routes or trails are re-routed to public land.

Under Alternative 1 OHV play area restrictions in LCM for Class I, III, and II use would be the least restrictive of any alternative.

Trail and route condition would degrade over the long term, due to no trail or route design, maintenance, or erosion controls. Opportunities for more difficult and most difficult Class I and III trails and Class II routes would continue to only be available through OHV user “pioneering” trails or routes, resulting in limited challenge and diversity for all OHV riders with different riding or driving skills. Year-round OHV riding opportunities would be provided in this area. Conflicts with non-motorized trail users would increase over the long term, as more of these trail and route users compete with motorized users for the same trail or route.

Game Retrieval

Under Alternative 1 opportunities for game retrieval would continue to be available on the 258, 064 acres of public lands legally accessible to the public. Alternative 1 has the largest amount of public lands open for cross-country motorized vehicle, ATV, or motorcycle game retrieval, so opportunities for game retrieval off routes is highest in this alternative.

Special Designations Effects on Recreation Opportunities

The fewest number of special designations would occur under Alternative 1. Other resource BMPs from existing land use plans currently limit motorized recreation use to existing routes in Wild & Scenic River corridors where public motorized access is available. Most motorized recreation use currently occurs outside WSR areas.

Under Alternative 1 motorized recreation use in WSAs and ACECs would continue to be limited to designated routes where motorized recreation use is allowed. Motorized use would not be affected by existing special designations. Motorized recreation riding or driving opportunities in these areas currently don’t exist, or are very limited.

Wildlife Effects on Recreation Opportunities

Under Alternative 1 motorized recreation opportunities would be least confined by seasonal wildlife restrictions. This alternative has the least amount of seasonal closure acreage, 86,793 acres, or 19% of public lands in the plan area. Year-round motorized recreation opportunities would continue to not be available on these public lands

Alternative 2

Motorized Recreation Opportunities

Under Alternative 2 the amount of trails and routes would be less than existing routes under Alternative 1. Motorized recreation users wanting cross-country exploration would have very limited opportunities for these

activities under this alternative than Alternative 1. Motorized cross-country OHV use would be allowed on 4,488 acres on the Rudio Mountain Plateau. No other public lands in the plan area would be open for year-round cross-country OHV use.

Under Alternative 2 , except for the Rudio Mountain Plateau and the LCM OHV play area, all motorized recreation use would be restricted to designated primitive routes on 367,298 acres of public land (Table 2-23). Public land classified as Limited would have designated Class I, III OHV trails, and Class II routes. All Class I, II and III OHV use would be restricted year-round to these routes and trails.

Opportunities for driving across public lands and driving on or off existing routes for recreation activities such as horn hunting, back-country exploration, game hunting, rock collecting, etc. would be restricted to the approximately 5,000 acres designated open. Visitors would either comply with these restrictions, go elsewhere to find these opportunities, or violate use restrictions.

Alternative 2 has more seasonal motorized closure acreage to meet wildlife and watershed health objectives than Alternative 1, so motorized recreation use would be limited to specific seasons of use. Opportunities for OHV use in seasonally closed areas would be lost, primarily in the winter and early spring. These seasonal motorized closure areas would affect 332,995 acres or 73% of public lands in the plan area. This is 246,202 more acres seasonally closed than under Alternative 1.

Conflicts between motorized and non-motorized users would occur under Alternative 2 wherever shared-use trails occur. Limiting both types of recreation use to the same trail would increase potential user conflicts, especially during weekend, holiday and hunting seasons. Repeated conflicts may result in limiting, or prohibiting OHV use on shared use trails with repeated user conflicts. If that occurred, fewer OHV riding or driving opportunities would be available.

Opportunities for a loop trail riding or driving experience, or technical rock crawling experiences would be more available under Alternative 2, than under Alternative 1. Trail or route loops would be identified and signed, providing more opportunities for OHV users who are most comfortable using signed routes and trails on public lands, than exploring and navigating without route signing and user maps.

OHV traffic volume on the BLM road system would likely increase, as well as OHV route and trail maintenance. The number of OHV user created routes may increase or decrease across the landscape depending on the amount and diversity of designated OHV trails and routes and user compliance to OHV use restrictions.

If determined to be suitable, a technical OHV Class II rock crawling area(s) would be designated on public lands between Service Creek and Kimberly, on the north side of Highway 19. This area would provide unique Class II rock crawling opportunities for visitors seeking this type of recreation opportunity.

Golden Triangle

Under Alternative 2, no opportunities for a long term OHV Play Area would be established; no opportunities for Class I and III Play would occur.

Little Canyon Mountain

Under Alternative 2, OHV use would occur year-round on designated routes and trails. OHV opportunities for Class I, III trail riding and Class II driving would be more restricted than under Alternative 1 by limiting OHV users to only to designated Class I, III trails and Class II routes. Alternative 2 would emphasize non-motorized trails in this area, so OHV opportunities would be lost on trails restricted to non-motorized use, while non-motorized trail opportunities would be enhanced by development of a non-motorized trail system close to John Day and Canyon City.

Under Alternatve 2, existing trails and routes would be used, with the addition of limited new trail or routes, as necessary, to provide a limited amount of non-motorized and motorized Class I and III trail and Class II route loops. Some designated trails or routes may be limited to specific types of OHV use, such as a technical Class III trail.

A designated Class I and III trail and Class II route system may provide less diversity in riding and driving than Alternative 1, depending on the number of trails designated only for non-motorized use and where non-motorized emphasis areas are located. Some Class I and III trail riding and Class II driving opportunities would be lost under Alternative 2, compared to Alternative 1, resulting in a less desirable location to ride or drive, and may result in random OHV use on other public or private lands. However, less trespass on private land would occur by signing designated roads and trails only on public lands.

Time restrictions on OHV use under Alternative 2, (9am to 6 pm daily), would limit morning, and especially evening OHV opportunities, particularly during late spring through the beginning winter months when daylight hours are greater. Some OHV users would either ignore this restriction, or be displaced and find other areas on BLM or other lands within the vicinity of this historic OHV use area. This regulation would affect law enforcement because increased law enforcement would be required to enforce new OHV designations.

Little Canyon Mountain OHV Play Areas

Under Alternative 2, opportunities for Class I and III OHV play would be lost (Table 4-21). Opportunities for Class II OHV play would be restricted only to the South OHV Play Pit. OHV play area restrictions would prohibit Class I and III use in the North and South Play Area Pits. The North OHV Play Area would be converted as a parking area and trail head. Class I, II and III OHV users who enjoy pit riding or driving are expected to find alternative play areas, resulting in continued conflicts in other areas. Other public or private lands may be used, resulting in trespass and conflicts with other public land visitors, private land owners and local enforcement, resulting in continued conflicts.

Little Canyon Mountain Non-Motorized Emphasis Areas/Motorized Emphasis Areas

Under Alternative 2, OHV opportunities would be reduced in Non-Motorized Emphasis Areas. Being limited to designated roads and trails may, or may not affect OHV use, depending on the amount of trails available for OHV use and level of trail or route difficulty. Increased opportunities for non-motorized activities would result from development of trails only for non-motorized use.

Game Retrieval

Alternative 2 has no public lands open for year-round cross-country motorized vehicle, ATV, or motorcycle game retrieval. Opportunities for motorized game retrieval would be limited to designated routes on 367,298 acres, and 84,823 acres closed to motorized use (Table 2-23). However, opportunities for big game retrieval would still be available on the 4,488 acre Rudio Mountain Plateau area.

Motorized recreation restrictions under Alternative 2 would eliminate most opportunities for hunters to retrieve big game on public lands. Realistically, some hunters would not remain on a designated route or trail to retrieve big game.

Wilderness Study Area (WSA) Effects on Recreation

Opportunities for non-motorized use would be the same as identified for Alternative 1. Opportunities for motorized activities in the lower John Day and Pat's Cabin WSAs would be the same as Alternative 1. Opportunities for motorized activities would be available seasonally on designated routes in the Aldrich Mountain, but would not be available on 2 miles of route in the Sutton Mountain WSA under any of the action alternatives. Big game hunters would be the primary recreation group displaced due to these two route closures.

Management of Wilderness Characteristics Effects on Recreation

Areas having Wilderness Characteristics, totaling 11,929 acres under the action alternatives would provide upland non-motorized recreation opportunities. However, there are no existing motorized roads or trails on these public lands.

Alternative 3

Alternative 3 would have the same affects as Alternative 2, with the following exceptions.

Golden Triangle

Under Alternative 3, opportunities for long term OHV play would be enhanced in the Mitchell area by establishing the Golden Triangle OHV Play Area north of Mitchell for seasonal Class I, II and III play. Only Alternative 3 would provide these opportunities. However, this 598-acre area is infested with the noxious weed Medusa Head, so eradication would be required before any OHV use would be allowed. It is estimated that eradication would take 3-4 years. Over the long term, the creation of this OHV play area would be desirable for Class I, II, and III visitors. No other alternative would provide an OHV play area near Mitchell.

Little Canyon Mountain

Under Alternative 3 in the Little Canyon Mountain OHV Area, opportunities for OHV Play in the South and North OHV Play areas would be the same as Alternative 1, providing more OHV Play opportunities for Class I, II, and III OHV users than Alternatives 2, 4, and 5.

Under Alternative 3, LCM daily time restrictions on OHV use from 9 a.m. to dusk would limit morning OHV use but would not affect evening OHV use. Proposed OHV time restrictions under this alternative would have limited effects on OHV use opportunities because almost all OHV use would occur during this time restriction. More OHV opportunities would occur under Alternative 3 than under Alternatives 2, 4, and 5, but fewer than under Alternative 1.

Game Retrieval

Alternative 3 would have the same effects as Alternative 2.

Alternative 4

Alternative 4 would have the same effects as Alternative 2, with the following exceptions.

Little Canyon Mountain

Day of week restrictions on LCM under Alternative 4 would restrict motorized recreation opportunities by restricting all OHV use to Monday, Wednesday, Friday and Saturday. Non-motorized recreation opportunities would be enhanced by not having to compete with motorized users for use on shared use trails and parking.

LCM OHV time restrictions under Alternative 4 would also limit OHV use from 9 a.m. to 6 p.m. Monday, Wednesday, Friday and Saturdays. Hence, fewer OHV opportunities would be available under Alternative 4 than Alternatives 1, 2 and 3. OHV users might ignore day of week and OHV time restrictions, riding on Sunday, Tuesday, and Thursday and evening riding particularly during late spring to fall months when daylight extends beyond 6 p.m. Some OHV users would stop riding, or find other areas on BLM or other lands to ride within the vicinity of this historic OHV use area. Some non-motorized users would plan their activities when OHV use is restricted and use more shared use trails, thus enhancing their recreation experience.

Under Alternative 4, the North OHV Pit would be closed to all motorized use. This action would result in OHV users finding other public or private lands to play on, and may result in trespass and resource damage to these lands.

Under Alternative 4, within the LCM Motorized Emphasis Area, OHV trails and routes would be limited to Class I and II use. There would also be a reduced number of routes and trails open to motorized use. However, the reduced amount of OHV trails would provide additional non-motorized trail opportunities.

Also under Alternative 4 the upper elevated routes and trails would have a seasonal OHV use restriction that would limit all OHV use during the winter and early spring months of the year. These OHV use restrictions eliminate

OHV Class III riding opportunities and would increase OHV congestion on trails or routes open year-round, due to seasonal elimination of routes and trails that help to disperse OHV use throughout the LCM OHV area.

Rudio Mountain Plateau Area

Motorized recreation in the Rudio Mountain Plateau area under Alternative 4 would be restricted to designated routes and trails year-round (Table 4-20). No opportunities for cross-country motorized use would be available in this area. Restricting unauthorized motorized recreation use off designated routes in the Rudio Mountain Plateau area would be difficult for BLM to and cost additional funds to rehabilitate unauthorized routes and trails.

The effects of limiting motorized recreation use to designated routes, rather than allowing seasonal cross-country use, is expected to affect hunters using Class I, II, and III OHVs during hunting seasons. OHV cross-country opportunities would not be available. However, non-motorized visitors, especially game hunters would have a higher quality of recreation opportunity, with reduced or no motorized visitors in the same hunting areas.

Game Retrieval

Alternative 4 would have the same effects as Alternative 2, except game retrieval would be limited only to designated routes on 365,242 acres. Opportunities for motorized cross-country game retrieval in the Rudio Mountain area would not be available. Game retrieval in this area would be limited only to designated routes and trails. No opportunities for motorized game retrieval would occur on 91,366 acres closed to motorized use.

Alternative 5

Alternative 5 would have the same effects as Alternative 2, except for the following.

Little Canyon Mountain

Under Alternative 5 opportunities for Class I, II, and III play would not be available because these activities would be prohibited in the North and South LCM play areas (Table 4-21). As in Alternative 4, these actions would reduce OHV riding opportunities less than Alternatives 1, 2, and 3, and would result in OHV users finding other public or private lands to play on. LCM Non-Motorized Emphasis Areas, in accordance with city and county land use plans, may restrict, or prohibit OHV use in these areas, depending on existing and future city and/or county ordinance regarding OHV use. LCM Motorized Emphasis Areas would be limited to designated roads and trails for Class I, II, and III users, so under this alternative, OHV riding opportunities would be available.

Under Alternative 5 a lower number of designated routes and trails and seasonal OHV use restrictions on upper elevated routes and trails would have the same effects as Alternative 4.

Rudio Mountain

Motorized recreation restrictions in the Rudio Mountain Plateau area would have the same effects on motorized and non-motorized recreation opportunities as Alternative 4.

Game Retrieval

Alternative 5 would have the same effects as Alternative 4, except game retrieval would be limited only to designated routes on 371,787 acres. No opportunities for motorized game retrieval would occur on 84,823 acres closed to motorized use.

Other Effects

Population growth in Oregon and more visitor use coming from western Oregon and other areas outside Oregon would continue to result in increased motorized and non-motorized recreation use on public lands. This increase would likely be most apparent in the popular Little Canyon Mountain, North and South Forks of the John Day River, and in the Rudio Mountain areas.

Although some private landowners currently allow public access across their lands, many do not. As landowners change, there is an increased likelihood that someone will deny public access across their land, reducing public access to public lands not legally accessible. These impacts may be reduced by BLM and the Oregon Department of Fish and Wildlife purchasing public access easements across private lands.

Motorized public access will continue to be more limited over time as the U.S. Forest Service Umatilla, Wallowa-Whitman, Malheur and Ochoco National Forests develop and implement travel management plans that will generally restrict motorized use more than current travel management regulations for these National Forests.

Motorized and Non-motorized recreation opportunities will still be available in various amounts on these forests, helping to meet the regional demand for these activities beyond existing and future opportunities available on BLM public lands in the plan area. The 6,000+ acre Morrow County OHV Park will continue to provide Class I, II and III riding opportunities, helping to provide these experiences in the region.

On BLM lands, seasonal closures, soil guidelines and road density restrictions would eliminate some roads and would affect motorized recreation users by eliminating year-round motorized recreation use in some areas. Although motorized hunting access would be reduced, big game animals may also be more abundant in unroaded areas, providing more opportunities for big game hunting in the long term and increased non-motorized recreation opportunities such as wildlife viewing, wildlife photography and other outdoor activities. These opportunities are expected to be enhanced with similar management actions occurring on adjacent U.S. Forest Service and Oregon Department of Fish and Wildlife public lands.

The closure of routes and seasonal use restrictions in the action alternatives will cause increased recreation use on routes that remain open to motorized use. Increased visitation and motorized use within the plan area would have cumulative effects on BLM's ability to designate, sign and maintain a final motorized and non-motorized designated route and trail transportation system.

Increased use would also result in higher motorized and non-motorized route and trail maintenance costs, increased expenses of closing and rehabilitating routes and trails according to resource BMP standards and increased costs for visitor contacting monitoring and mitigation actions, and law enforcement patrols.

The creation of user-created routes and violations of motorized seasonal closures are expected to increase over time, especially during big game hunting seasons in the North and Fork of the John Day River, the Rudio Mountain/Johnson Heights and Dixie Creek areas. Increased user-created routes in these locations would result from increased OHV regulations that limit OHV seasonally, limit or prohibit OHV use in some areas, or limit the amount and location where designated routes and trails are located.

Other public or private lands may become used for OHV play by OHV users in locations that may not follow BLM management direction, or may not be acceptable to private landowners.

However, the cumulative effects of OHV restrictions in each of the action alternatives would reduce the possibility and flexibility to provide, year-round OHV riding opportunities on designated routes and trails that don't conflict with non-motorized trail use, particularly in the Little Canyon Mountain OHV Area. This would be due to various OHV use restrictions that discourage or eliminate some or all types of OHV use.

Table 4-22. Summary of recreation management effects on public lands recreation in the plan area by alternative.*

Indicators	Alternative 1 No action. Continue present management	Alternative 2 Balances resource needs with access needs	Alternative 3 Emphasis commodity and public use	Alternative 4	Alternative 5
Recreation Setting	River based recreation management emphasis and Unmanaged motorized and non-motorized recreation emphasis allowing cross-country recreation use.	River based recreation; same opportunities as Alternative 1. Managed motorized and Non-Motorized use on designated roads & trails. Recreation emphasis would provide more diversity of motorized and non-motorized recreation opportunities than Alternative 1.	More motorized recreation management emphasis than alternative 2. All other affects same as Alternative 2.	Less motorized and more non-motorized recreation emphasis than Alternative 2. All other affects same as Alternative 2.	Same effects as Alternative 4
Special Recreation Management Area (SRMA)	One 119,052-acre John Day Special Recreation Management Area would provide river based recreation opportunities. No other managed recreation settings in plan area; more conflicts with motorized and non-motorized users in same areas, due to no designated trails separating uses.	Higher quality motorized & non-motorized recreation opportunities within Five SRMAs totaling 293,397 acres; John Day River, Bridge Creek, North & South Forks John Day River, and Little Canyon Mountain (LCM); less conflicts with motorized and non-motorized users through designated trail management.	Same effects as Alternative 2	Same effects as Alternative 2	Same effects as Alternative 2.
Extensive Recreation Management Area (ERMA)	One 337,559-acre existing Extensive Recreation Management Area; all public lands outside of the existing John Day River SRMA. Long term user conflicts continue.	Three Extensive Recreation Management Areas totaling 163,214 acres; Rudio Mountain, Dixie Creek and John Day Basin. Reduced user conflicts through designated route management.	Same effects as Alternative 2	Same effects as Alternative 2	Same effects as Alternative 2.
Recreation Developments	15 existing facilities provide access to river and public lands.	15 existing facilities provide access to river and public lands. Up to four new developments; North (2) & South Fork (1) John Day Rivers (1).	Same effects as Alternative 2, plus 598 acre OHV Open Area in the Golden Triangle and 4,488 acre Rudio Mountain Areas. More OHV play opportunities over the long term than Alternative 2.	Lower OHV Play opportunities than Alternative 2; no OHV Play Area Development in the Golden Triangle and Rudio Mountain areas. All other affects same as Alternative 2.	Same effects as Alternative 4

* See Appendix K for a more detailed Summary of SRMAs.

Recreation Permits

Introduction

Analysis of the environmental consequences of the alternatives on Recreation Permits considered the following key resources or resource uses: Vegetation, Fuels, Fire Management, Noxious Weed Control, Wild Horses, Wildlife, Special Designations (Wilderness Study Areas, ACECs, RNAs), Wilderness Characteristics, Paleontological and Cultural Resources, Special Recreation Management Areas, Recreation Permits, OHV Management and Travel Management.

Indicators used to compare environmental consequences between alternatives include: number of annual commercial permits available, number of commercial, competitive, educational, and organized group permits issued.

Recreation Permit Indicators

- **Recreation Opportunities.** The types, levels of satisfaction, and amount of area available for various recreation activities. The changes in recreation opportunity by alternative are the same for recreation permits are those discussed under non-guided recreation in general.

Recreation Permit Assumptions

- 1 The actual number of recreation permits would be determined later.
- 1 The number of available permits includes permits currently administered by BLM within the plan area, as well as permits which are currently unfilled.
- 1 The number of available permits allotted for an activity or use area may be greater or less in number than the current demand for permits.
- 1 Authorized BLM permit holders help protect natural resources because they are held accountable for good stewardship of public lands and they assist the BLM in spreading Leave No Trace and Tread Lightly messages to the general public.
- 1 Requiring upland groups over 12 in number to inquire with the BLM to determine whether a permit is required would allow BLM to discuss resource concerns with the group leader, mitigate these concerns if possible, steer organized groups to areas that can best accommodate their use, and notify groups if a permit is required prior to use of the public lands.

Analysis of the Effects of the Alternatives on Recreation Permits

Unless discussed below, actions proposed under any alternative would have no measurable effect on recreation permits at the planning scale.

Vegetation, Fuels, Fire Management, Noxious Weed Control, and Wild Horse Management Effects on Recreation Permits

Under all alternatives, treatments to restore and rehabilitate public lands would increase commercial recreation opportunities in the long term by improving the condition of the public lands, but may result in temporary disruption to some commercial activities or use areas.

Wildlife Effects on Recreation Permits

Under all alternatives seasonal road closures, would have the same affect on recreation permits as on recreation in general.

Special Designations (Wilderness Study Areas, ACECs, RNAs) Effects on Recreation Permits

All Special designations include management actions designed to protect resources or experiences. These management actions include restrictions on guided and/or non-guided recreation activities in areas containing these resources. As a result of these actions, the number and type of permits issued would be reduced most under Alternatives 2, 3, and 5, less under Alternative 4, and least under Alternative 1.

Wilderness Characteristics, Paleontological and Cultural Resources Effects on Recreation Permits

Existing management designed to protect paleontological and cultural resources to be continued in all alternatives and would continue existing restrictions on guided and/or non-guided recreation activities in these areas. Additional management designed to protect Wilderness Characteristics in Alternatives 2-5, would include restrictions on guided and/or non-guided recreation activities in these areas.

Special Recreation Management Areas Effects on Recreation Permits

Existing management goals identified for the John Day River SRMA to be continued in Alternative 1, plus management goals identified for additional SRMAs and ERMAs in Alternatives 2-5, will be factors BLM considers when evaluating a proposal for a commercial recreation permit. To be considered, a permit proposal must be in compliance with the management goals for the SRMA or ERMA where the activity is proposed.

Recreation Management Effects on Recreation Permits

Continuing the existing moratorium on new commercial permits in Alternative 1 would not address the backlog of permit requests BLM has received and continues to receive for the plan area. Discontinuing the moratorium in Alternatives 2-5 would create opportunities for new annual upland-based commercial permits as the BLM addresses the backlog of NEPA analyses required for permit issuance. The availability of new upland-based commercial permits would provide more options for recreation users to participate in guided recreation activities authorized by the BLM, provide increased (but not unlimited) business opportunities for those wishing to offer a guide service, and help address unauthorized guiding on BLM lands by making legal alternatives available.

Criteria and objectives under Alternatives 2-5 increase the risk of future decisions limiting the number or type of commercial permits available in a given area and/or place restrictions on the permitted use such as number of use days, group size, area of use, or mode of transport. Permit availability may be limited by BLM's ability to administer and monitor permits. The availability of upland-based commercial permits would be expected to gradually increase from the current level of 12 (includes 9 unfilled Bighorn Sheep guiding permits) to approximately 35

Wild and Scenic River Management Effects on Recreation Permits

The existing management of the Wild and Scenic River Plan is carried forward under all alternatives. The changes to recreation permits follows the general recreation effects by alternative.

Travel and OHV Management Effects on Recreation Permits

Existing travel management actions to be continued in Alternative 1, plus additional travel management actions as proposed in Alternatives 2 and 3, would have the same affect on recreation permits as on recreation in general.

Other Effects

With an increasing Central Oregon population and the accompanying popularity of recreating within the plan area, the demand for new commercial permits is expected to continually exceed BLM's ability to process, administer, and monitor permits.

Access and Travel Management

Introduction

Analysis of the environmental consequences of the alternatives on access and travel management considered the following key resources or resource uses: Fuels and Fire Management, Recreation (OHV), Soils, Wildlife, ACEC, VRM, Grazing Management, Aquatic Resources and Vegetation Management (Forestry.)

The following indicators were used to compare and assess the effects: Miles of interim roads, miles of roads closed, miles of interim road seasonally open, miles of interim roads opened year round and average road densities across BLM lands. The assumptions underlying these indicators are described below.

Access and Travel Management Assumptions

- 1 The interim transportation system would be managed and maintained until the completion of a Transportation Plan within 5 years of the ROD for this RMP. 1
- 1 Within WSAs, motorized use is either closed or limited to designated routes to protect the Wilderness Characteristics of the area. Wilderness legislation prohibits mechanized travel within a wilderness area. When a WSA is designated by Congress as Wilderness, existing routes within that area will be closed to mechanized travel are not available for transportation network.
- 1 Not all public land can be legally accessed by the public (e.g. Federal lands that are land locked by private land owners without any public access routes or easements.) Road mileage calculations do not always differentiate between mileage with or without legal public access.
- 1 Across BLM land within the plan area, there are 109 miles of roads whose jurisdiction is outside of BLM's control. These routes belong to the state, county or another agency and the public can utilize them to access public land and are only used for cumulative effects analysis.
- 1 Routes with administrative easements across private lands are closed to public access.
- 1 Most ROW routes and public easement routes are open for public use without seasonal restrictions.
- 1 Road closure proposals not currently identified in this planning document would undergo additional environmental review with associated public input.
- 1 BMPs would be utilized for construction, rehabilitation, maintenance and general management of the transportation system (Appendix B). These BMPs would be consistent across all alternatives.
- 1 BMPs for the following resources would have no measurable impact on the transportation system: Weeds, Special Designations, Vegetation, Aquatic Resources (Fisheries).
- 1 Average Daily Traffic (ADT) is the summation of the number of trips in and the number of trips out of an area.
- Reserved Forage Allotments (RFA) will be treated as open allotments when analyzing impacts to the transportation system. An isolated grazing allotment is one that requires traveling across a private land holding in order to access (e.g. no administrative easement across the private land holding.)

Analysis of Effects of the Alternatives on Access and Travel Management

Effects Common to All Alternatives

Proposed management of the following resources and resource uses would not have measurable impacts to Access and Travel Management: Wild Horses, Cave Resources, Native American Uses, Paleontological Resources, Cultural Resources, Visitor Services, Wild and Scenic Rivers, and Wilderness Characteristics at the planning scale.

Access and Travel Management Effects on Access and Travel

Under Alternative 1, continuation of current transportation system would have no new effects on maintenance or degree of public access.

Table 4-23 shows road density values by alternative for six sub areas within the plan area along with the average prescribed road density limits.

Table 4-23. Average Road Density for BLM Lands (mi/mi²)

Sub Area	Average Prescribed Road Density Limit	Existing (Alt. 1)	Alternative 2, 4, 5	Alternative 3
Upper John Day	1.15	3.5	1.5	3.5
Lower John Day	1.26	1.2	0.4	1.1
North Fork John Day	2.0	0.6	0.8	2.3
Rudio Mountain	1.04	1.4	0.4	1.4
South Fork John Day	2.0	1.7	0.6	1.6
Sutton Mountain	1.35	1.3	0.7	1.3

Alternatives 2, 4, and 5 would be based on meeting resource goals and objectives, while balancing cultural, ecological, and social and economic values. Eighty six miles of BLM road would continue to be maintained for passenger vehicles while 138 miles of primitive routes would receive minimal maintenance on an as needed basis and would limit motorized access to high clearance/4x4 vehicles. Only 5 miles of new road construction is proposed while 36 miles of road would be permanently closed for hydrologic concerns. Approximately 46 miles of road would be identified for pursuing easements to gain access to large blocks of land locked public lands.

Under Alternatives 2, 4, and 5, 409 miles of roads (55%) are not designated as part of the interim transportation system, effectively reducing access to public lands. However, 241 of the 409 miles that would be closed are short segment routes that are land locked by private land holding with no public access rights. This results in 27% of existing routes being closed to the public until a Travel Management Plan can be completed.

Under Alternatives 2, 4, and 5, the interim road system meets the road density limits for 5 of 6 sub areas and would allow routes to be added for OHV trails, ROW and other uses in all sub areas but the Upper John Day. In the upper John Day, the road density will need to be reduced on average by 0.40 mi/mi² or approximately 6 miles.

Alternative 3 emphasizes recreation and public uses of public lands. Approximately 137 miles of currently closed routes would be reopened in the North Fork John Day area. Increased access could increase as well as maintenance costs in the North Fork John Day area. Under Alternative 3, 662 miles of primitive routes would receive minimal maintenance on an as needed basis and would limit motorized access to high clearance/4x4 vehicles. The miles of roads maintained for passenger vehicles, miles of proposed easements and miles of road proposed for construction would be the same as Alternative 2. Route closures would be limited to WSAs and routes identified as hydrologic concerns. The total mileage of roads proposed for closure due to hydrologic concerns in 36 miles. Similar to the existing situation, Alternative 3 would have over 250 miles of road only accessible through private lands without public access; trespassing across private lands would continue as the public tries to access public lands. This may also lead to private land owners locking off their property and effectively closing access to public lands.

Alternative 3 would be similar to Alternative 1 in the North Fork John Day area, except it would require modifying which roads are reopened to meet road density requirement. Instead of reopening 137 miles in the North Fork John Day area, the amount would be 111 miles or less. In Lower John Day, South Fork John Day and Rudio Mountain sub areas, additional routes could be added for OHV trails, ROW, and other uses.

Fire and Fuels Management Effects on Access and Travel Management

Routes heavily used by fire equipment are likely to be temporarily damaged; however, fire rehabilitation efforts would correct damaged roadbeds. During prescribed fires and wildfire containment, some routes will likely be temporarily closed to the public, or temporarily opened to assist in fire fighting efforts.

Under existing management (Alternative 1), fuels treatments would be applied to 3,600 acres annually, resulting in short term traffic increases on 8 miles of road annually.

Alternatives 2, 4, and 5 have a full range of appropriate management responses (AMR) available for areas outside of Wildland Urban Interface (WUI). The impacts to the transportation system will vary. When the AMR is to monitor or point control, impacts to routes will be minimal. When the AMR is perimeter control or full suppression, road use and public safety concerns during fire suppression activities may cause temporary closure or temporary opening of closed routes. There are 706 miles of roads within the 434,306 acres of AMR. The management of wildfires within the 85,391 acres of designated WUI areas would not change, nor would the impacts to the 139 miles of roads within the WUI. Fuel Treatments would occur on 5,400 acres annually, resulting in short term traffic increases during fuel treatment activities on 9 miles of road annually.

Cultural Resources Effects on Access and Travel Management

For both Alternative 1 and the action alternatives, areas where site specific monitoring reveals cultural resource concerns, road construction, rehabilitation and maintenance activities are likely to be restricted or mitigation measures applied to the activity.

Energy and Minerals Leases Effects on Access and Travel Management

For both Alternative 1 and the action alternatives, areas developed for energy or minerals (including leaseable, locatable and salable minerals), there exists the potential for site specific access needs. A ROW would be provided and the BLM would dictate the location and design standards for these routes. The action alternatives would have less area unconstrained for energy development than Alternative 1 (Table 17), and thus may result in fewer site specific actions related to access.

Lands and Realty Effects on Access and Travel Management

For both Alternative 1 and the action alternatives, potential land acquisition could add road mileage to the system, while land suitable for disposal could reduce the road mileage. In addition, the granting of ROW could increase the mileage of routes available across public land. The BLM would dictate the location and design standards for any ROW road permit. Many of the ROW permitted roads are maintained by permittees. Recreation and Public Purposes (R&PP) leases on lands near municipalities may decrease the mileage of routes available for public use.

Grazing Management Effects on Access and Travel Management

Traffic associated with daily grazing management activities is estimated at a 2 vehicles per day Average Daily Traffic (ADT) per allotment during the grazing period for each road that accesses an allotment. For every isolated grazing allotment that is closed, the ability to access these allotments for other management purposes is eliminated. In many cases, only administrative access to these tracks of land would be available because of the grazing allotment. As grazing leases are renewed, there would be an opportunity to allow the grazing permittees to maintain BLM roads as a stipulation to the lease.

Under current management (Alternative 1), 221 allotments are open and 9 allotments are closed. For these allotments, the truck hauling traffic is estimated at 221 round trips per year on the roads accessing the allotments. Currently only 1 allotment is open in the North Fork John Day area, which has negligible impact on traffic in the area.

Under Alternative 2, up to 8 grazing allotments in the North Fork John Day have the potential to be leased as Reserve Forage Allotments (RFA). As a result, truck hauling traffic would see minor increases of up to 16 round trips per year on the roads in this area. Daily grazing management activities would increase local traffic counts to the area. The ADT increase during the grazing period would be approximately 16 vehicles per day on the North Fork John Day Road and less on the side roads. The increase in traffic, especially during wet periods would cause additional damage to the roads and result in increased maintenance needs.

Under Alternative 3, up to 10 grazing allotments in the North Fork John Day would be leased. As a result, truck hauling traffic would see minor increases of up to 20 round trips per year on the roads in this area. Daily grazing

management activities would increase local traffic counts to the area. The ADT increase during the grazing period would be approximately 20 vehicles per day on the North Fork John Day Road and less on the side roads.

Under Alternative 4, 145 of the 210 allotments have the potential for closure if the permits are relinquished. Traffic would decrease 2 ADT for every grazing allotment closed. Maintenance would decrease as well as the number of cooperative agreements to allow grazing permittees to maintain BLM roads.

Soils Effects on Access and Travel Management

The Alternative 1 BMPs are recommended for road maintenance and construction activities but are not specific to the plan area, and hence may not be effective in minimizing excess erosion. Under this alternative, 253 miles of roads are classified as having excessive erosion (0.75 pounds per ft average annual erosion rate).

Under the action alternatives, roads with excessive erosion would receive rehabilitation, decommissioning, or obliteration when any new roads are constructed. BMPs and guidelines would be tailored to the plan area and would minimize erosion. For interim routes, maintenance intensities would temporarily be adjusted on these routes to a level where excessive erosion can be controlled and maintained at acceptable levels.

In Alternatives 2, 4, and 5, only 19 miles of the interim road system have excessive erosion. The other 234 miles of roads with excessive erosion are not part of the designated interim system and may not require any further actions beyond closing the road.

In Alternative 3, 132 miles of the interim road system have excessive erosion. Like the other action alternative, roads that are not part of the designated interim system and may not require any further actions above closing the road.

Areas of Critical Environmental Concern (ACEC) Effects on Access and Travel Management

Within Alternative 1, 6,329 acres are designated as ACEC. There are approximately 10 miles of roads within these ACECs. Traffic within these areas is restricted to the designated roads. This restriction has had minimal impact to the maintenance of these roads.

Under the action alternatives, the area proposed for ACEC designation would be increased to 68,188 acres. Within the boundaries of these proposed ACECs are 111 miles of roads where traffic will be restricted to the designated routes. Maintenance and construction of roads within ACEC boundaries is likely to be restricted by the VRM classification of the individual ACEC. Rights-of-way (ROW) for private land holding access would be restricted to existing routes, and would allow the BLM to have the ROW permittees maintain these roads.

Visual Resources Management (VRM) Effects on Access and Travel Management

For Alternative 1, Table 4-24 shows the acreage of existing VRM Classes within the plan area and the mileage of roads within those areas. Very limited road maintenance activities are allowed in VRM Class I. In VRM Class II, road maintenance and construction activities cannot attract attention and changes cannot be evident in the character of the landscape. In VRM Class III, road maintenance and construction can occur, but its evidence is subordinate to the character of the landscape. In VRM Class IV, road maintenance and construction activities are allowed.

Table 4-24. Existing Visual Resource Management (VRM) Classes and road miles within VRM Class.

VRM Classes	BLM Acreage within Plan area	BLM road miles within VRM Class
I	95,755	158
II	101,987	165
III	175,092	284
IV	83,548	136

For the action alternatives, Table 4-25 shows that across the landscape, the only changes in VRM class would be within the acquired lands of the North Fork John Day area and likewise, the only impacts to the transportation systems would be for those roads within this area.

Table 4-25. Visual Resource Management (VRM) Classes and BLM road miles within VRM Classes for the Action Alternatives.

VRM Classes	BLM Acreage within Plan area	BLM road miles within VRM Class
I	95,755	158
II	146,304	237
III	164,235	266
IV	50,285	82

Recreation Effects on Access and Travel Management

Under Alternative 1, 337,559 acres are designated as Extensive Recreation Management Area, with no impacts to the 658 miles of road within this area. There is currently only one Special Recreation Management Area (SRMA). The Lower John Day River SRMA is 119,052 acres and includes the Spring Basin, Thirtymile, North Pole Ridge, and Lower John Day WSAs. Within this SRMA all traffic is limited to designated roads and trails and no cross country travel is allowed. Utilizing a reduced road density of 0.5 mile/mile^2 to account for the large roadless areas within the WSAs, travel is currently limited to approximately 93 miles of road.

With the implementation of benefits based recreation criteria for the action alternatives (see Recreation, Chapter 2), the level and type of access available for public use would vary based on the setting for each Special Recreation Management Area (SMRA). In the 108,908 acres designated as aPrimitive setting, no new roads would be constructed. These areas are roadless. In the 25,770 acres designated as a Back Country setting, 42 miles of existing routes, if not already closed, could be converted to non-motorized trails. New construction would be limited to trails. Road rehabilitation, construction and maintenance activities are allowed in Middle Country, Front Country and Rural settings. These three settings allow for motorized access. In the 218,232 acres designated as Middle Country, the 355 miles of roads are more primitive. Typically these minimally maintained primitive routes have native surface and are passable to high clearance 4x4 and OHVs. The 8 miles of roads through Front Country (1,949 acres) and Rural (2,617 acres) settings range from primitive roads to those that are maintained to be passable to passenger vehicles.

For Alternative 1, continuation of existing OHV management would have no new effects on the maintenance and degree of public access. Currently, 258,064 acres are designated as Open, which allows the user to travel anywhere within that area. Within the 131,318 acres designated as Limited, OHV use is concentrated on 213 miles of roads. Only 67,226 acres are currently closed to OHV use, amounting to 109 miles of roads experiencing no use.

In Alternative 2, OHV users would be allowed off-road on 4,488 acres in the Rudio Mountain area. Within the 367,298 acres designated as Limited, OHV use will be concentrated on 597 miles of roads. Maintenance needs will increase for 384 miles of roads resulting from concentrated OHV use. 84,823 acres would be Closed to OHV use, amounting to 138 miles of roads that will experience no use. With the reduction in Open designated areas, the number of OHV user created routes will decrease across the landscape.

Alternative 3 is similar to Alternative 2 with the exception that an additional 598 acres would be designated as Open.

In Alternative 4, only two acres are designated as open, reducing the likelihood of user created routes to a no effect on the transportation system. The area designated as Limited is essentially the same as Alternative 2. The acres designated as Closed would increase to 91,366 acres resulting in will be 149 miles of roads that will have no OHV traffic.

In Alternative 5, there would be no lands designated as Open to OHVs. The Limited designated land would increase to 371,787 acres resulting in concentrated use on 604 miles of roads. Maintenance needs will increase for 391 miles of roads resulting from concentrated OHV use. The amount of closed roads would be the same as Alternatives 2 and 3.

Vegetation Management (Forestry) Effects on Access and Travel Management

The identified haul routes associated with individual forest products sales would increase traffic, particularly that associated with the timber harvest activities. The impacts related to this increased traffic is typically off-set by requiring the purchaser to either improve the road prior to hauling activities and/or maintaining the road throughout the hauling activities.

Currently under Alternative 1, the existing allowable timber cut is 3.58 mmbf/year and the estimated traffic volume associated with hauling these forest products is 796 round trips. For the action alternatives , the allowable cut is 2.54 mbf/year. The estimated traffic volume associated with hauling is 565 round trips, and traffic would decrease by 231 round trips; likewise, the maintenance needed on the designated haul routes would decrease.

Wildlife Management Effects on Access and Travel Management

Within Alternative 1, 45 miles of roads have seasonal closures for wildlife. These roads are mostly in the South Fork John Day, North Fork John Day and Battle Creek areas. Under the action alternatives, seasonal wildlife closures would apply to all routes, except the following collector roads: Franks Creek, Holmes Creek, South Fork John Day, Priest Hole, Deer Creek, Sunflower Creek, Murderers Creek, and Indian Creek. With no traffic between December 1 and March 31, maintenance needs would decrease. Mitigation measures and seasonal work windows would be applied to construction and maintenance activities as needed. In Alternative 2, 4, and 5, 138 miles of roads, or 41% of the designated interim routes, would be open seasonally. In Alternative 3, 475 miles of roads, or 54% of the designated interim routes, would be opened seasonally.

Aquatic Resources Effects on Access and Travel Management

Activities conducted to protect aquatic habitat such as altering or closing stream crossings and habitat restoration, are likely to temporarily or permanently affect public access and road maintenance. Under Alternative 1, the current PACFISH objectives would provide guidance on these road related activities.

Under the action alternatives, 36 miles of roads would be closed to motorized public use due to hydrologic concerns. In addition, when the ACS decision tree is applied to individual roads, there is likelihood that some roads would require rerouting or upgrading to protect aquatic concerns. A route closed to motorized use due to hydrologic concerns may still provide non-motorized public access to the area.

Summary of Effects on Travel Management

In all alternatives there is a portion of the transportation system that could only be accessed by obtaining permission from adjacent land owners. Without public easements across these private lands, there would be no legal access to the public lands for the general public.

Under Alternative 1, the transportation system would continue to be managed by current practices. Maintenance and construction activities are controlled by resource BMPs. The transportation system includes 250 miles of roads with no legal access and 45 miles of seasonally opened roads. 475 miles of roads are classified as primitive and only accessible to high clearance vehicles.

In the action alternatives, the identified transportation system is an interim system only. A Transportation Management Plan would be developed 5 years after this RMP to address the final transportation system on a site by site basis. The determination of which roads are part of the final transportation would be based on the criteria listed in chapter 2, while remaining within the average prescribed road density limit. In addition, the BLM has identified desired road easements to gain more public and administrative access to public lands. These future road easements would depend upon having private land owners willing to enter into access agreements.

Alternatives 2, 4, and 5 would have reduced road access and lower maintenance costs when compared to Alternative 1. Roads that did not have legal access were not included in the interim transportation plan which accounts for the reduced access and decrease in maintenance. Average road density standards are lower than the existing road densities.

Alternative 3 would be similar to the current level of access and maintenance, except there would be more miles of road under seasonal use restrictions for December through April. Many of these routes are snowed-in during this time frame. The increase in the mileage of interim routes available for public access is the result of lifting some of the closures in the North Fork John Day area. Average road density is similar to Alternative 1, except in the North Fork John Day area.

Other Effects on Travel Management

Population growth in Central Oregon and the Willamette Valley, as well as an increased interest in OHV and mechanized vehicle use, recreation, and tourism could result in increased motorized use of the plan area in the reasonable near future. Increase visitation and motorized use within the plan area would have cumulative effects on transportation including higher maintenance costs, increased route closures, monitoring and mitigation actions, and more traffic rule enforcement.

The closure of routes and seasonal use restrictions in Alternatives 2, 3, 4 and 5 would cause increased traffic on non-restricted routes and would result in higher maintenance associated with these routes. Routes across private lands that have been traditionally used by the public are continuing to be closed by private land owners due to private lands damage or change of ownership, thus increasing use on other routes. Likewise, the adjacent US Forest Service lands are changing their travel management by restricting all motorized use to designated routes or Open areas. Without the opportunity for Open cross country use, the number of user created routes will be reduced. With the majority of the traffic being concentrated on a smaller transportation system, wear and tear on roads, such as those near Little Canyon Mountain, would increase as would the associated maintenance costs.

Protection of resources dictates increased management, which inevitably requires stricter controls on access and user numbers, thus minimizing cumulative effects in some areas and concentrating effects on the major collector routes. Implementation of BMPs for transportation actions (Appendix B) should also minimize cumulative effects within the plan area under all alternatives.

Acquiring additional road easements to provide public access to land locked public parcels would provide short term relief to increased visitation in some areas. But in the long term the cumulative effects of these additional roads on transportation would include higher maintenance costs, increased route closures, monitoring and mitigation actions, and more traffic rule enforcement.

Energy and Mineral Resources

This analysis examines the availability, quantity, and abundance of energy and mineral resources under each alternative relative to demand.

Analysis of Effects of the Alternatives on Energy and Mineral Resources

Effects Common to All Alternatives

All five alternatives would maintain similar levels of availability and quantity of energy and mineral resources. Under all alternatives, energy and mineral resources on public land within the plan area would generally be abundant relative to the anticipated demand.

Under all five alternatives, almost all lands would remain available for the location of mining claims under the mining laws, but most on-the-ground mining activities near riparian areas would require the review of an interdisciplinary team to determine if the proposed impacts would exceed ACS standards.

Under all five alternatives, common varieties of rock would continue to be available from existing quarries. A few quarries may be closed, reclaimed, or potentially replaced by new sites.

Under federal law and BLM policy, all public lands are open for energy and mineral exploration and development, unless specific lands are closed or withdrawn from mineral entry. An example of such a withdrawal would be the establishment of a federal wilderness. All five alternatives would provide opportunities for new exploration for all types of minerals. Despite some differences between alternatives in constraints on mineral and energy development (Tables 2-17), most of the plan area would remain open to mineral entry. Such entries would be subject to certain restrictions as required by law or as a result of decisions supported by site-specific environmental analysis.

Under all five alternatives, almost all lands would continue to be available for oil and gas leasing and the exploration and development for conventional oil and gas. Although prices for oil and gas are expected to continue to rise relative to the costs of exploration and development, the actual physical occurrence of oil and gas in most parts of the plan area is speculative and largely dependent on the results of current exploration drilling occurring in south-central Washington.

A few federal oil and gas leases have been issued within the plan area since the current resource management plans were adopted from 1986 through 1989. Lands in the central portion of the plan area follow the Blue Mountain Anticline (see Chapter 3) and have the best potential to attract leasing and exploration interest for conventional oil and natural gas deposits.

Under all alternatives, most lands would continue to be open for the location of mining claims under the Mining Law of 1872 (as amended). The levels and locations of activity are expected be about the same as they are currently, with a few exceptions (Tables 2-17). The highest levels of activity would continue to be in the Little Canyon Mountain and Prairie City areas.

Within the plan area, there are 15 existing quarries for common variety minerals. It is assumed that few of these quarries would be depleted over the life of this plan and therefore do not need replacement. Demand for common variety material is closely correlated with population growth and road maintenance needs. The expansion of existing quarries or the opening of new sites would be allowed if circumstances change and demand outpaces current supply.

Communities and Economies

Introduction

Analysis of the environmental consequences of the alternatives on the local economy and communities living within the John Day Basin considered the following key resources or resource uses: (forest products), Livestock Grazing, Recreation (use and permits), Access and Travel, Special Designations, Fire and Fuels, Agricultural Lands, Lands and Realty, and Energy and Minerals. The analysis also assessed relative effects of the alternatives on BLM expenditures and employment, disabled users, environmental justice, payments to counties, ecosystem restoration, amenities, migration, and non-market values..

Indicators used to compare environmental consequences between alternatives include: employment and labor income created/lost from BLM management actions, changes to community well being, and concerns expressed by the communities living and interested in the John Day Basin.

Social and Economic Assumptions

- 1 The plan area population will continue to increase and age as described in Chapter 3.
- 1 The social groups are defined to facilitate the discussion of social impacts. These discussions simplify what are often quite complex and unique values and attitudes and the groupings presented here are by no means mutually exclusive. For example, many ranchers also participate in recreation activities. It is

also worth noting that attitudes, interests, and values often change over time. The social analysis will cover the groups and individuals that are most likely to be affected by this plan.

- 1 Regional economic impacts are estimated based on the assumption of full implementation of each alternative. The actual changes in the economy would depend on individuals taking advantage of the resource-related opportunities that would be supported by each alternative. If market conditions or trends in resource use were not conducive to developing some opportunities, the impact on the economy would be different than estimated herein.
- 1 Resource specialists projected annual resource outputs based on the best available information and professional judgment. The purpose of the economic analysis is to compare the relative impacts of the alternatives and should not be viewed as absolute economic values.
- 1 99.5 percent of timber harvested within the analysis area is logged by logging contractors, while 0.5 percent is logged by local residents.
- 1 Timber harvested within the analysis area would be distributed among the following sectors: sawmills and planning mills (98 percent) and prefabricated wood buildings (less than one percent).
- 1 The ratios of harvest to jobs and income used to assess the impacts of the alternatives are based on statewide ratios developed for Oregon by the University of Montana (Keegan *et al.* 2003).
- 1 Over the long term, timber prices are residual values determined by national and international markets based on what the final product market will pay for timber, rather than supply competition at the local level (Lippke *et al.* 2006, pg iii). In addition the share of timber contributed to total harvest in the area is relatively too small to have price impacts in the short term.
- 1 Projected recreation visits are distributed among different types of visitors based on the results of National Visitor Use Monitoring surveys conducted for the Malheur, Ochoco and Umatilla National Forests.
- 1 The ratios of recreation visits to jobs and income used to assess the impacts of the alternatives are based on national ratios developed through the Forest Service's National Visitor Use Monitoring program.
- 1 Baseline recreation demand is assumed to increase by three and a half percent per year.
- 1 Non salary-related expenditures made by the Prineville District Office are assumed to be allocated to different economic sectors based on data compiled for the Ochoco National Forest.
- 1 AUMs under the Reserve Forage Allotment classification are assumed to be utilized 33 percent of the time as regular AUMs (personal communication with Prineville District Office Range staff).
- 1 Range revenues received by BLM and the value of BLM AUMs to operators were calculated using the conservative AUM price for 2007 of $1.35 per BLM AUM and $10 per AUM leased in the competitive market.

Analysis of the Effects of the Alternatives on Communities and Economies

This section presents an analysis of social and economic impacts for the management alternatives proposed in the John Day Basin Draft RMP/EIS. It discusses economic then social effects common to all alternatives, economic and social effects common to the action alternatives. and then economic and social effects of each alternative.

This section will discuss employment, labor income, and effects on sectors in the eight county area economy that encompasses the John Day Basin. Impacts to tax revenues, environmental justice, and social communities within the basin will also be presented. Finally forecasts for the area will be discussed in light of the changes predicted over the 10 year period of analysis.

The economic analysis focuses on changes in labor income and employment associated with BLM planning actions and estimated outputs for the alternatives (Table 4-26). The social analysis focuses on changes to social and economic well-being. Higher employment, subject to some qualifications, can be seen as a benefit to the local community. Other benefits are also present, although some are not easily measured or tied to economic activity. An example of where effects are difficult to quantify are equity effects or impacts to social values. Regardless, these benefits are discussed despite our inability to quantify them.

Economic Effects Common to All Alternatives

At the John Day Basin planning scale, none of the alternatives would be expected to reduce economic diversity (the number of economic sectors) or increase economic dependency, which occurs when the local economy is dominated by a limited number of industries. While the alternatives have the potential to affect local businesses and individuals, the relative contribution of BLM related activities to the local economy and the relative differences between the alternatives would not be large enough to have any measurable effect on economic diversity or dependency.

This is also the case with respect to economic and social well-being, which can be assessed in terms of changes in income, employment and the season of employment, and population.

Table 4-26. Estimated Outputs by Alternative[1]

Output	Current[2]	No Action	Alternatives 2-5
Cattle (head months)[3]	12,620	21,980	
Sheep (head months)	2,640	2,880	(see table 4-29 below)
Agricultural Lands (acres)	250	400	180
Estimated Forest Product Output (hundred cubic feet)[4]	1,708	6,642	4,820
Bentonite (short tons)	NA[5]	134	134
Construction Sand and Gravel (short tons)	4,660	4,660	4,660
Crushed Stone (short tons)	1,550	1,550	1,550
General Recreation (visits)[6]	108,557	131,810	131,810
Fish and Wildlife Recreation (visits)	35,545	43,160	43,160
Prescribed Burning (acres)	6,980	4,000	4,000
Mechanical vegetative treatments (acres)	900	700	700
Road Obliteration (miles)	1.5	3	1.1

[1]All resource outputs, except recreation, are expected to remain constant over the ten year analysis period. These figures are approsimate and intended solely for the purpose of economic and social analysis.

[2]Estimates include actual use levels (average annual use).

[3]Data are based on head months available for activation. The share of actual use from what is available has decreased from 78 percent in 1999 to 48 percent in 2007 (see Table 3-17). I head month of cattle and horses=approximately 0.77 AUMs for cattle and horses; 1 head month for sheep and goats=approximately 3.4 AUMs for sheep and goats.

[4]Sawtimber data are based on the Probable Sale Quantity. The current annual average harvest is approximately 26 percent of the current Allowable Sale Quantity.

[5]Bentonite is not currently removed from the plan area.

[6]Recreation visits are expected to increase by 3.5 percent each year.

Estimates of the levels of employment and labor income that would be supported by the alternatives are based on projected resource outputs from BLM management actions (Table 4-27). Estimated average annual employment and labor income are summarized by resource area in Table 4-27 and Table 4-28 respectively. The projected outputs and estimated employment and labor income are discussed by resource in the following sections.

Forest Products

Both the no action and action alternatives would continue to supply wood product materials as shown in the estimated forest products ouput estimates in Table 4-26 above. Under the no action alternative the current Allowable Sale Quantity (ASQ) would potentially be available, while under the action alternatives the Probable Sale Quantity (PSQ) would potentially be available. To the extent practical, the preferred alternative would allow for the entry of new business that might offer value added products (such as log homes or furniture) or biomass energy. These nontraditional materials have sometimes been considered low value forest materials, however industries could develop in the region that would utilize these products more efficiently.

While harvests under the no action and action alternatives would not have a large effect (considering the total amount of material available from all ownerships in the area, (Figure 3-34); they are still important. Considering decreases in federal harvests throughout the region (Figure 3-34), the BLM has recently provided a greater share of forest products than it has in the previous 40 years. Despite relative decreases in actual levels of harvest from BLM lands, BLM may provide an increasing share of the total harvest if the PSQ estimates are harvested.

The vegetative treatments proposed under all alternatives would tend to reduce the occurrence and intensity of wildfire events. These treatments are expected to reduce the severe levels of tree mortality and site damage that are experienced during large scale, stand replacement events, and would reduce the amount of salvage volume available from such events in the future. The treatments, which intend to reduce the severity of wildfire events, would also supply future forest products, helping to sustain economic conditions.

The existing management and proposed alternatives would sustain current local government revenues from forest product sales within the area, as 4 percent of non-stewardship timber receipts are paid to the counties where they are generated. If PSQ estimates were achieved (beyond the 26 percent of existing PSQ harvested) revenues received by counties would increase.

Livestock Grazing and Ranching

The relatively low level of economic dependency on BLM forage would continue under all the alternatives. BLM would provide a maximum of approximately 2 percent and a minimum just under 1 percent of total forage needed to feed livestock in the plan area. Jobs and labor income associated with grazing would continue to account for less than one percent of area totals (in both the smaller Gilliam, Grant and Wheeler area and the larger eight county area).

While economic dependency would remain low, we can reasonably assume BLM forage would continue to provide a low cost and important complement to some livestock producers' grazing, forage, and hay production. However, the value to area operators is not evident in the projected job and employment impacts, but should be considered. The value to these operators from BLM grazing can be estimated as the difference between the competitive market price of an AUM and the BLM lease fee. This value is experienced above the price ranchers pay for AUM leases and can be considered a benefit. The benefit to operators from BLM grazing varies amongst the alternatives, however would not fall below $48,500.

Recreation Use and Recreation Permits

The role of recreation in the local economy will continue to increase as OHV use, boating and other forms of recreation continue to increase. Travel to the basin from throughout the state to enjoy these opportunities is not an unreasonable assumption. A statewide survey of Oregon motorized trail users completed in 2004 stated that more than half of motorized trail users travel more than 40 miles to enjoy their favorite motorized trail activity, and one-fifth travel more than 100 miles (Oregon State Parks 2005 pg 37). Population projections for counties in and around the plan area suggest an annual average increase of 3.5 percent is reasonable and conservative (State of Oregon DAS 2007).

An annual average of approximately 132,000 general recreation visits and 43,000 fish and wildlife-related recreation visits are projected under all the alternatives (Table 4-26). This increase over the current level of visitation would be due to the baseline increase in recreation visits (3.5 percent per year) that is projected under all of the alternatives. It is assumed that revenues received by BLM from campground and commercial recreation fees would increase at a similar rate and would thus average about $16,000 annually.

While there are no differences anticipated as a result of the alternatives, recreation actions would sustain use levels important to the area economy and well-being. Under all alternatives, area recreation on BLM administered lands would sustain approximately 100 jobs and $2 million in labor income annually in the eight county plan area (Tables 4-27 and 4-28). Economic impacts from the recreation program are estimated to be the largest among programs managed within the John Day Basin.

Jobs and income associated with recreation management should not overshadow the economic value of experience by recreation users within the basin. Boating use in the lower river basin could change as management

actions associated with the John Day River Plan are implemented. Additionally, if Congress designates the North Fork John Day as a Wild and Scenic River, increased use may result. Conservative benefit estimates for river use in Oregon and California (Douglas *et al.* 1998) value a per person per day river trip at $34.67 in 2006 dollars. Given river visitation numbers for 2006 (boater visits from Prineville District office staff) the value of float boating, canoeing and rafting totaled $669,200. This number would at least be maintained with recreation management proposed in the alternatives, and could increase with increased use levels. Similar estimates for OHV and other motorized or non-motorized recreation are not available given the lack of data regarding visitor use levels for these activities.

Fire and Fuels Treatment

Projected fuel treatment costs range from approximately $437,000 to approximately $635,000 annually under all alternatives. Potential wildland fire-related costs (such as property loss, lost revenues, and suppression costs) can not be projected. It is commonly accepted that fire suppression costs and risk to life and property should be less when wildland fires occur where hazardous fuels have been treated compared to areas where fuels have not been treated. For example, fires generally burn hotter, flame length is higher, and fires in tree canopies are more likely in non-treated areas.

It is anticipated that fuels treatments on public lands within the plan area would contribute to fuels conditions that would have less resistance to wildland fire control. This would tend to reduce the threat to life and property. It is not, however, possible to project the level of non-prescribed wildland fire that would occur under any of the alternatives. Based on the level of hazardous fuels treatments under the proposed alternatives, one might conclude fire suppression costs would be greater than in the past since fewer acres would be treated than currently (see Table 4-26). However the use of appropriate management response (including Wildland Fire Use) on approximately 1,500 acres would essentially act as treatment in areas already prone to fire, further reducing future wildland fire related costs.

BLM Expenditures and Employment

Levels of expenditures and employment at the Prineville office of the BLM and within the John Day Basin are not expected to vary by alternative. While this is not a planning level decision, it is an important contribution to the local area economy and well-being. Expenditures and employment in the basin are expected to follow recent trends as outlined in Chapter 3 (Table 3-17) and may slightly decrease (personal communication with Prineville District Office Budget staff). Because expenditures from BLM actions that occur solely within the basin could not be separated from the overall Prineville district office expenditures, they were not included in the impact analysis.

Energy and Mineral Resources

Saleable minerals, such as sand and gravel, would continue to be provided by BLM in the plan area. While bentonite is not currently mined, proposals have been submitted and commercial activities are likely to occur in the future. While these mining activities are not a direct result of new planning actions in this resource management plan, management under this RMP will allow and determine the nature of these activities. Less than one job and $18,800 in labor income would be supported by this mineral activity (Tables 4-27and 4-28.) Since the sand and gravel operations utilized by the county and state governments operate under free use permits, no revenues are received by BLM and consequently no payments to counties are made. Similarly the bentonite mine would operate under the 1872 mining law, under which claims pay no lease fees (however they would pay federal taxes on revenues received).

Locatable and leaseable minerals are not common in the plan area, however they would be available and subject to the stipulations under this resource management plan. Under all the alternatives, all public lands would be open to recreational mineral collection unless there are prior rights in an area, such as mining claims.

Renewable Energy

While all land in the plan area without surface occupancy restrictions would potentially be available for wind development (given further site specific review), not all land can be considered suitable for development. Developable land for wind energy depends on the wind resource and transmission line availability and

capacity. Decisions to invest in wind energy are also dependent on the cost of alternative sources of energy, as well as the regulatory environment and other costs to society. Natural gas, oil and coal prices, therefore also determine the level of wind energy investment. The commercial viability of wind power also depends on the pricing regime for power producers. All of these components are difficult to predict and make speculation on possible development impractical.

However some speculation can be made based on professional judgment. Within approximately 20 miles of the Mid Columbia River Corridor, private land available for wind energy development is saturated. Within this corridor, development interest may exist on BLM lands. Further south, only site specific areas with high wind potential will be of interest (personal communication with Paul Woodin). BLM administered lands with high wind potential may not be plentiful in the plan area and would thus limit development. Additional costs associated with development on public land (i.e. site specific planning) may inhibit development as well. However, given further saturation of available private land and/or changes in energy markets and technology, development on BLM administered lands in the plan area may become more likely.

Other Impacts

Under all alternatives, economic diversity indicated by the number of economic sectors would remain relatively unchanged, though shifts in emphasis could occur. Costs to local governments would also remain unchanged as a result of planning actions, i.e. demand for services and infrastructure would not change as a result of BLM planning actions. The dependency of the local economy on livestock industry, forest products, mining, and recreation activities would not be affected by BLM resource management. Additionally, resource management on BLM administered lands would not change local economic diversity, dependency, or stability.

Social Effects Common to All Alternatives

The following social analysis assesses the potential effects of management actions common to all the alternatives on identified social groups. These groups were identified based on past studies in and around the plan area, public scoping and public meetings conducted for the John Day Basin RMP. The analysis addresses the potential impacts of the alternatives based on the issues and concerns raised by these groups during the public involvement effort.

Forest Products

Forest product-related issues raised during public involvement included concerns regarding fuel hazard reduction, impacts to scenery and other resources, dead tree salvage and area jobs. As noted above, the current annual average harvest is approximately 26 percent of the current ASQ. Thus harvest levels under all alternatives may be infeasible given historic differences in ASQ and actual sales. Some individuals and groups interested in resource protection would be less likely to prefer the current situation as it pertains to hazardous fuel reduction but prefer the resource protection they associate with less harvest. Individuals and groups interested in resource use would find the continued depressed harvests less favorable since fewer jobs are created. However some might prefer the fact that more salvage opportunities may be created as fuels continue to go untreated. The potential for unharvested salvage that might also occur under this scenario would further exacerbate the frustration of others interested in resource use.

One measure of social well-being often considered is change to the season of employment common in the area. BLM related activities in the basin include logging and recreation, which are typically characterized by seasonal employment, but none of the alternatives would be expected to affect existing trends in the season that employment occurs.

Effects to Disabled Users

Under all alternatives, individuals with disabilities could request a permit to travel on closed roads consistent with the Rehabilitation Act of 1973. Such access would be considered on a case-by-case basis by the Prineville District Office.

Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low income populations. The Order further stipulates that agencies conduct their programs and activities in a manner that does not have the effect of excluding persons from participation in, denying persons the benefits of, or subjecting persons to discrimination because of their race, color, or national origin.

None of the proposed alternatives would be expected to have disproportionately high and adverse human health or environmental effects on minority and low income populations[1]. All alternatives are expected to result in increases in employment and labor income over the next decade which will remain a small share of total employment and labor income within the eight counties that comprise the plan area. Public involvement efforts for this project have been inclusive and the agency has considered input from persons or groups regardless of race, color, national origin, income, or other social and economic characteristics.

Economic Effects Common to Action Alternatives

Ranching

A determination of changes to livestock grazing provided by BLM is speculative given high degrees of variation that could result with implementation of the grazing matrix (see Livestock Grazing section of Chapter 2 for a description of the Grazing Matrix). Under all alternatives, the authorized level of use could increase by no more than 2.6 percent. However given voluntary relinquishment of grazing permits, authorized use could decrease below current actual use levels by as much as 63 percent.

As stated above this decrease is speculative since it depends on voluntary relinquishment of permits. The economic contribution from BLM would decrease; however, we cannot infer changes in equity from this decrease. Since ranchers act in their own best interests, and seek to improve their well-being, voluntary relinquishment would at least maintain or improve their well-being.

Given the possibility of voluntary relinquishment and closure of some allotments with use of the grazing matrix, average annual employment and labor income supported by all grazing alternatives could drop slightly (Table 4-30). It is also possible, despite closure of some allotments, that the matrix will accommodate a slight increase in average annual employment and labor income. This may be less likely given historic trends in actual use of authorized AUMs (Table 3-19), however if demand for AUMs existed and market conditions were favorable, the contribution from BLM grazing could increase.

Under the action alternatives, and with possible full relinquishment of grazing permits, payments to counties would decrease to levels below those currently experienced. Regardless, these payments would provide for a small amount of area employment and income.

The benefit of BLM AUMs to area ranchers could potentially decrease from Alternative 1 to the action alternatives ($195,000) with full relinquishment of permits. It must be noted however that efficiency gains and economic well-being could remain the same or increase as conflicts are resolved with the grazing matrix.

Recreation Permits

Outfitters and guides would have more opportunity under the action alternatives than currently since BLM would issue new upland-based special recreation permits as deemed appropriate by this RMP.

Non-Market Values

The economic analysis assesses the economic effects of the direct use of resources in terms of jobs and income. This type of analysis does not include other types of economic value often referred to as non-market values,

[1]This is supported by the fact that the analysis area does not have a minority population as described in Chapter 3.

which were discussed in Chapter 3. Non-market values are important to the welfare of visitors, area residents and others outside the basin. They include natural amenities, quality of life factors, recreational opportunities, ecosystem services and non-use values such as existence, option and bequest values.

Non-market values associated with recreation opportunities are addressed along with economic effects from recreation when data is available. Other non-market values are difficult to quantify or insufficient data exists to assess the effects of management actions. However, the fact that no monetary value is assigned to these values does not lessen their importance in the decision making process.

Regardless, we can make some helpful inferences. While there is a general consensus that non-use values exist, the methodologies for measuring these values are controversial and difficult to apply. Wilderness has been the subject of numerous non-use studies, usually conducted for specific natural areas, however no attempt has been made to directly elicit potential non-use values associated with the alternatives under this RMP. None of the alternatives propose new wilderness[2], but the action alternatives would establish areas to be managed for Wilderness Characteristics, several new Areas of Critical Environmental Concern (ACECs) are proposed, and segments of the North Fork John Day River are recommended for congressional designation to the National Wild and Scenic River System (NWSRS). Under the action alternatives, a total of 11,929 acres are proposed to be managed by BLM for protection of Wilderness Characteristics and 74,827 acres of ACEC/RNAs would also be proposed. Under the no action alternative, management for wilderness character is limited to previously identified Wilderness Study Areas. The proposed action would also increase the amount of ACECs by more than ten times what is currently designated. These designations would further maintain and perhaps enhance non-market values associated with natural amenities protected on these lands.

The Role of Natural Amenities and Migration

In addition to ACECs, land to be managed for Wilderness Characteristics and recommended as Wild and Scenic Rivers, may attract new residents to the area which would then contribute to area economic activity. Natural amenities and quality of life have been increasingly recognized as important factors in the economic prospects of many rural communities in the West (Rudzitis and Johnson 2000). In addition, non-labor income is intimately tied to natural amenities as discussed in Chapter 3. Rural county population change, the development of rural recreation, and retirement-destination areas are all related to natural amenities (McGranahan 1999). Thus the established ACECs and land to be managed for Wilderness Characteristics may similarly contribute to area economic well-being.

In conclusion, impacts from program related activities under the action alternatives could support higher levels of employment and labor income than currently experienced. Recreation provides the largest program related contributions to area jobs and labor income under all the alternatives. The largest employment and labor income effects would occur in the accommodations and food services, agriculture, and retail trade industry sectors (FEAST 2007). Impacts associated with forest products and grazing are speculative considering differences in actual and authorized use levels. PSQ estimates under the action alternatives would accommodate levels of forest product contributions seen in the past. However utilization of the grazing matrix could decrease levels of authorized AUMs through voluntary relinquishment and some closure of allotments.

The benefit of BLM AUMs to area ranchers could potentially be less under Alternative 1 ($195,000) than under the action alternatives with full relinquishment of permits. It must be noted however that efficiency gains and economic well-being could remain the same or increase as conflicts are resolved with the Grazing Matrix (Tables 2-10 and 2-11). Other non-market values may be enhanced with the matrix, offsetting losses in the benefit of BLM AUMs to area ranchers. For example, in-stream flow and water quality could increase existence values as populations of Mid-Columbia river steelhead improve.

[2]If the current WSAs are released by congress for other uses, the BLM would designate them as the Lower John Day ACEC, managed under no-surface-occupancy requirements for oil and gas development, and closed to wind development and motorized vehicle use. These restrictions would maintain the non-market values associated with these protected lands.

Social Effects Common to Action Alternatives

Ranching

Issues brought up during the public involvement process concerning ranching included access and OHV use. Many of these issues and others more specific to certain allotments have the potential to be addressed with implementation of the grazing matrix. Under grazing Alternatives 2 through 5, the matrix modifies livestock grazing to reduce conflicts between grazing and other uses (Tables 2-10 and 2-11). Human uses, ecological conflict and AUM demand would be considered in this decision. Thus concerns with access and OHV use could be addressed with the matrix. Individuals and groups interested in access, and ranchers would likely prefer solutions presented with the matrix rather than the no action alternative. In addition, reserve forage allotments would be available which would often give livestock operators more flexibility.

Some AUMs would be closed as there is one grazing matrix category that would not be dependent on permit relinquishment, and in this case grazing would be discontinued in those allotments when the Record of Decision is finalized. Closure of allotments that are in use is unlikely to occur since future BLM access across private land cannot be guaranteed. More often closure would occur on allotments where grazing has not occurred in the recent past.

Access and Travel Management

Individuals and groups interested in access and motorized recreation would favor Alternatives 1 or 3 over the other alternatives given higher motorized access opportunities provided under these alternatives. However, under the action alternatives travel on interim routes would be subject to future travel management planning which could increase opportunities for these individuals and groups. Those interested in resource protection and non-motorized uses would likely prefer the action alternatives over existing management; adjustments to the transportation system in order to provide protection for soils, water quality, wildlife and other resources could address some of their concerns.

Recreation

The overall effect of limiting class I, II and III OHV use to designated roads and trails, except within the designated open areas, would be less favored by individuals and groups interested in OHV, hunting and access. However these changes could be favored by those interested in resource protection and non-motorized uses. General areas subject to these changes include the Bridge Creek SRMA, Lower John Day SRMA and the ERMA[3].

Despite these new area designations, some areas, such as the JV Ranch, which have been historically closed would be designated as limited to designated trails. This change could be preferred by OHV users, hunters and those interested in access. Technical Class II, Class III and mountain bike opportunities would be provided under the action alternatives. Horseback riding, camping, boating, wildlife viewing, hunting, recreational mining, rock hounding, antler collecting and scenic driving opportunities would continue to be provided by the action alternatives.

Outfitters and guides would have more opportunity under all alternatives than they currently do since BLM would issue new upland-based special recreation permits as appropriate. Opportunities along the river could be enhanced given the moratorium on new permits and transfers would be discontinued. Individuals and groups interested in niche market opportunities would likely prefer this over the no action alternative. Employment for locals was an interest often expressed during the public involvement process. These new permits were often cited as a means to capture more jobs locally which could occur under the action alternatives.

Limits on access by hunters, outfitters, and guides might occur with restrictions on cross country OHV travel and game retrieval. However, game retrieval by other methods such as horseback may become more common with restrictions on OHV use.

[3]Localized impacts from changes in OHV management direction would be most likely to occur in the Rudio Mountain, Little Canyon Mountain area, and Lower John Day SRMA which would be managed differently under the action alternatives.

Forest Products

Continued access to forest products was a concern stated during public involvement by individuals and groups interested in resource use and niche market opportunities. During formation of the plan, all communities, regardless of size, have been considered as specialists examined areas for special forest product uses. Areas within 25 miles of communities greater than 100 in population were considered for these uses, which essentially amounted to the entire plan area.

Special Area Designations

Under the action alternatives, areas to be managed for Wilderness Characteristics are identified, several new ACECs are proposed, and segments of the North Fork John Day River are recommended for congressional designation as WSR. Some individuals and groups interested in resource protection would favor the increase in these management designations since they prefer the increased resource protection they associate with these designations. Some believe designation as a Wild and Scenic River may attract more visitors which could contribute to increased resource damage. Individuals and groups interested in niche market opportunities would similarly favor the action alternatives, as unique area opportunities are enhanced under the John Day Paleontological ACEC or designation of WSR.

Concerns with possible Wild and Scenic River designation were frequently raised during the public involvement process. Area residents were often concerned about impacts of allowable uses on private property and increased use and associated impacts to river resources. Designation would not impact allowable uses on private property and increased use along the river would be managed to protect resources and minimize conflicts.

Tribal Treaty Rights

Under the action alternatives, BLM will manage vegetation to fall within the acceptable range of variability, with diverse plant communities that contain healthy populations of a variety of native species. Enhancement of wildlife habitat and native plant communities provides increases in opportunity for tribal members to exercise tribal treaty rights such as hunting, fishing, and gathering on public lands. Consultation with tribes will increase communication and coordination for mutually beneficial resource management.

Economic Effects of Alternative 1

Forest Products

Alternative 1 would allow an average annual harvest of approximately 6,642 CCF of forest products (Table 4-26). The majority of this estimate (6,638 CCF) is based on the sawtimber PSQ and reflects the annual volume that would be available rather than actual harvest projections. Annual average harvest is approximately 26 percent of the current ASQ. The remainder of the harvest estimate consists of fuel wood and post and poles (4 CCF). If harvests were to occur at PSQ levels, approximately 82 jobs and $1.8 million in labor income (Table 4-27 and Table 4-28) would be supported within the local or regional economy. In addition to direct job and income impacts in the forest products industry, these estimates include impacts to industries that provide factors of production to the forest products industry, and other industries impacted by wage related spending.

Alternative 1 would maintain current levels of BLM forest product offerings and require no adjustment in current economic condition. If ASQ estimates were achieved, economic well being would potentially improve.

Ranching

Alternative 1 would authorize average annual grazing of approximately 21,980 cattle head months (HMs) and 2,880 sheep HMs (Table 4-29) and support approximately 4 jobs and $114,000 in labor income (Table 4-27 and Table 4-28). Annual revenues received by the BLM from grazing permits would amount to approximately $30,500.

The benefit of BLM AUMs to operators associated with 22,620 BLM AUMs would continue to be approximately $195,000. So while estimated impacts are relatively small in comparison to area employment and labor income, the value of BLM AUMs to area ranchers would be maintained.

Payments to Counties

All of the AUMs leased by the BLM within the John Day Basin are section 15 permits, from which 50 percent of revenues are distributed to the state and then local counties. Estimated grazing revenue distributions to local counties would be about $15,000. County payments from forest product sale under this alternative would total $18,495. Average annual employment associated with these payments to counties would support close to one job and $29,480 in labor income. These estimated payments depend upon actual use levels being equal to PSQ and AUM's authorized. If actual harvests and AUMs utilized followed existing trends, impacts to employment and labor income would be far less than predicted here. On an average annual basis, payments to counties from forest product receipts and grazing leases currently support less than half a job and $13,950 in labor income (Tables 4-27 and 4-28). Average annual contributions to counties under this alternative would likely remain close to current levels.

Table 4-27. Average Annual Employment[1] by Program by Alternative (full and part-time jobs)

Resource	Current	No Action Alternative 1	Alternatives 2-5
Recreation	81	98.3	98.3
Wildlife and Fish Recreation	28.6	34.7	34.7
Forest Products	21	81.8	59.4
Grazing	4.4	7.4	See Table 4-30
Minerals	0.3	0.4	0.4
Ecosystem Restoration	6.3	4.3	3.9
Payments to Counties	0.4	0.8	0.3
Total BLM management	142	228	197
Percent change from current		61%	39%

[1]Average annual values are based on projected impacts over the 10-year analysis period. Source: Potential employment and labor income impacts are based on the estimated resource outputs summarized by alternative in Table 2-24. Potential impacts were estimated using the IMPLAN model and FEAST.

Table 4-28. Average Annual Labor Income by Program by Alternative (thousands of 2007 dollars)

Resource	Current	No Action Alternative 1	Alternatives 2-5
Recreation	$ 1,689.92	$ 2,051.90	$ 2,051.90
Wildlife and Fish Recreation	$ 601.92	$ 730.85	$ 730.85
Forest Products	$ 465.44	$ 1,810.03	$ 1,313.56
Grazing	$66.26	$113.83	See Table 4-31
Minerals	$ 16.01	$ 18.79	$ 18.79
Ecosystem Restoration	$ 162.94	$ 115.97	$ 101.75
Payments to States/Counties	$ 13.95	$ 29.48	$ 11.57
Total BLM management	$ 3,016.43	$ 4,870.84	$ 4,228.42
Percent change from current		62%	40%

Table 4-29. Maximum and Minimum Head Months Possible with the Grazing Matrix

Resource	Current	Alt 1	Alternatives 2/5		Alternative 3		Alternative 4	
			min	max	min	max	min	max
Cattle	12,620	21,980	7,719	22,545	7,831	22,569	4,656	22,040
Sheep – Horn Butte	2,640	2,880	9,50	2,877	9,50	2,877	950	2,877

Table 4-30. Average Annual Employment Associated with Grazing by Alternative (Full and Part-time Jobs)

Resource	Current	Alt 1	Alternatives 2/5		Alternative 3		Alternative 4	
			min	max	min	max	min	max
Grazing	4.4	7.4	2.6	7.6	2.6	7.6	1.6	7.5
Payments to counties			0.137	0.401	0.138	0.401	0.088	0.393

Table 4-31. Average Annual Labor Income Associated with Grazing by Alternative (Thousands of 2007 dollars)

Resource	Current	Alt 1	Alternatives 2/5		Alternative 3		Alternative 4	
			min	max	min	max	min	max
Grazing	$66.26	$113.83	$39.92	$116.68	$40.48	$116.81	$24.42	$114.13
Payments to counties			$ 5.11	$ 14.98	$ 5.17	$ 15.00	$ 3.30	$ 14.68

Recreation

It is estimated that recreation, including fish and wildlife-related recreation activities, currently accounts for approximately 59 percent of all the jobs and 57 percent of labor income that could be supported by Prineville District Office activities (Table 4-27 and Table 4-28). Motorized access and motorized recreation opportunities would not change from the current condition.

Ecosystem Restoration

Under the no action alternative, existing management that would be continued includes ecosystem restoration activities that would contribute to the area economy. These include mechanical vegetation treatments, prescribed burning and road obliteration. On an average annual basis, approximately 1.5 miles of road is obliterated while existing management would indicate more could be treated to comply with water quality and other ecosystem restoration goals. Along with mechanical treatments, road obliteration is an intensive process that contributes to the area economy. Combined with contributions from prescribed burning these ecosystem restoration actions would support approximately 4 jobs and $116,000 in labor income in the area economy (Tables 4-27 and 4-28).

In conclusion, under Alternative 1, the estimated number of jobs and labor income associated with BLM resource management would be about 228 and $4.9 million respectively. These BLM-related jobs and labor income impacts would likely continue to be less than one percent of totals within the local area economy. The largest employment and labor income effects would occur in the accommodations and food services, agriculture, and retail trade industry sectors (FEAST 2007). All program revenues collected by the federal government related to management within the basin under this alternative would be about $509,000 per year. Annual payments to the counties in the plan area would be approximately $34,000 which does not include Payment in Lieu of Taxes(PILT) payments (see section People in the John Day Basin/Revenue Sharing in Chapter 3).

Economic Effects of Alternative 2

Forest Products

Alternative 2 would provide for an average annual harvest of approximately 4,820 CCF of forest products (Table 4-31). The majority of this estimate (4,817 CCF) is based on the sawtimber PSQ and reflects the annual volume that would be available, rather than actual harvest projections, if the Prineville Office committed to treating 1,000 acres per year by commercial and pre-commercial thinning. The remainder of the harvest estimate would consist of fuel wood and post and poles (3.21 CCF). This harvest, if it were to occur, would support approximately 60 jobs and $1.31 million in labor income (Table 4-27 and Table 4-28). Alternative 2 offers less forest products and thus has smaller consequent impacts than the no action alternative. However it must be noted that only 26 percent of ASQ has been harvested historically. Alternative 2 could thus maintain or increase the jobs and labor income supported through a forest product management since potential CCF under the offered PSQ is greater than recent harvests from BLM.

Ranching

Alternative 2 could authorize a maximum average annual of approximately 22,545 cattle HMs and 2,877 sheep HMs (Table 4-29) which could support two jobs and approximately $40,000 in labor income (Table 4-30 and Table 4-31). Conversely this alternative could authorize a minimum of 7,719 cattle and 950 sheep HMs that could support approximately 7 jobs and $117,000 in labor income. These job and employment impacts would represent an increase or decrease from what is currently contributed from grazing, however BLM grazing related jobs would continue to remain a relatively small portion of overall employment and labor income for the area.

Annual revenue received by BLM from grazing under Alternative 2 would range from $11,700 to $34,300. The benefit of BLM AUMs to area ranchers would range from $75,000 to $219,900. So again, while estimated impacts from the range of possible grazing matrix outcomes are small, the value of these AUMs to local ranchers is important. The AUM benefit could potentially be less than Alternative 1; however, economic well-being could remain the same or increase as conflicts are resolved with the grazing matrix.

Payments to Counties

Annual payments to counties from grazing permits would range from $5,850 to $17,160. Associated employment would remain less than one and labor income impacts would range from $5,000 to $15,000 (Tables 4-27 and 4-28). Payments to counties from forest products could total $13,260 with associated impacts of less than one job and $11,570 in labor income (Tables 4-27 and 4-28). Payments to counties from both range and forest product revenue distributions would remain similar to the No Action Alternative, however with full relinquishment of grazing permits, distributions could decrease by approximately $5,000 from current levels.

Recreation

The number of recreation visits to the John Day Basin would likely increase at a rate of 3.5 percent per year over the next 10 years regardless of changes in this RMP. The projected average annual visits summarized for Alternative 2 in Table 4-31 were estimated based on this expected increase. Employment and income impacts described above under Effects Common to All Alternatives give more detail on these impacts. However it is worth noting that recreation would remain as the largest contribution to area employment and income by BLM management program under this alternative.

Ecosystem Restoration

Levels of prescribed burning, mechanical treatments, and road obliteration would be less in Alternative 1 than in Alternative 2. Jobs and labor income associated with ecosystem restoration activities would consequently be just less in Alternative 2 than Alternative 1 at 3.9 and $102,000 respectively (Tables 4-27 and 4-28).

Land Tenure

This RMP revision proposes increasing the number of acres zoned Z-3 (available for disposal) from 40,000 to 70,000 acres. While zoning this land as Z-3 makes disposal possible, it is far from guaranteed. Further NEPA processes not covered under this plan would evaluate the availability of this land for disposal if proposed. If this land is disposed, it would no longer count towards the entitlement acreage used in PILT calculations which would decrease the contribution from BLM land in the area. However if BLM land is disposed, it would be subject to property taxes whereas before disposal it was not. Payments under PILT are designed to help offset losses in property taxes due to the nontaxable status of Federal lands within state or county boundaries. Therefore, in theory, county property taxes should increase offsetting losses from the qualifying entitlement acreage for PILT.

If BLM land ownership does shift, approximately 18,000 acres of this Z-3 land is most likely to be disposed. These lands qualify under the Federal Land Transaction Facilitation Act, as lands that BLM can sell and use the money to buy more land on the district. This would comprise approximately 4 percent of 2007 BLM entitlement acreage in the eight county study area. Any one county could loose these lands and the associated payments while the other counties would theoretically then see increases in payments with gains in entitlement acreage. Impacts associated with these payments to any one county would be less than one job and $4,700 in labor income. Despite these possible changes, total PILT payments from the federal government to the eight counties within the study area would likely continue to remain around recent levels.

In conclusion, under Alternative 2 the estimated total number of jobs and labor income associated with BLM land and resource management would be about 200 and $4.3 million, respectively. These BLM-related contributions, i.e. jobs and labor income, would likely continue to be less than 1 percent of the total within the local economy. The largest employment and labor income effects would occur in the accommodations and food services, agriculture, and retail trade industry sectors (FEAST 2007). Annual program revenues collected by the federal government and payment to counties would range from $359,000 to $381,000 and $19,000 to $30,000 respectively (depending on the degree of livestock permit relinquishment).

Economic Effects of Alternative 3

Ranching

Alternative 3 would authorize a maximum and minimum average annual HM contribution slightly higher than the other action alternatives (Table 4-29). These use levels could support slightly greater amounts of area employment and labor income. However, BLM grazing related contributions would continue to remain a relatively small portion of overall employment and labor income for the area. The range of annual revenue received by BLM from grazing and the benefit of AUMs to area ranchers ($11,850 to $34,350 and $76,000 to $220,100 respectively) would be slightly higher under Alternative 3 than the other action alternatives.

Payments to Counties

Annual payments to counties from grazing permits would be slightly higher in Alternative 3 than the other action alternatives ($5,930 to $17,180). Associated employment and labor income impacts from these payments would be slightly higher than the other action alternatives as well (Tables 4-27 and 4-28). Payments to counties from forest product harvests would remain the same as described in Alternative 2 (Tables 4-27 and 4-28).

Role of Amenities, Migration and Non-market Values

As discussed above under Effects Common to Action Alternatives, more land would be managed for Wilderness Characteristics, as ACECs, and more miles of the North Fork John Day would be recommended for designation as WSR under the action alternatives than Alternative 1. Alternative 3 recommends the same number of miles be designated WSR, except under either a Scenic or Recreation classification, depending on segment. This alternative would ensure protection of non-market values and natural amenities valued by current and new residents to the area to almost the same degree as Alternative 2.

In conclusion, under Alternative 3 the estimated total number of jobs and labor income associated with BLM land and resource management would be about 200 and $4.3 million, respectively. These BLM-related contributions, i.e. jobs and labor income, would likely continue to be less than 1 percent of totals within the local economy. The largest employment and labor income effects would occur in the accommodations and food services, agriculture, and retail trade industry sectors (FEAST, 2007).

Economic Effects of Alternative 4

Ranching

Alternative 4 could authorize a maximum average annual HM contribution slightly less than the other action alternatives and a minimum authorized level less than the other action alternatives by about 3,000 HMs (Table 4-29). This would support a smaller amount of area employment and labor income associated with grazing than the other action alternatives (Table 4-30 and 4-31). The range of annual revenue received by BLM from grazing under Alternative 4 would be less than the other action alternatives ($7,570 to $33,640) as well as the benefit of BLM AUMs to area ranchers ($48,500 to $215,500).

Payments to Counties

The range of possible annual payments to counties from grazing permits under Alternative 4 would be lower than the other action alternatives ($3,780 to $16,820). Associated employment and labor income impacts from these payments would be less than the other action alternatives as well (Tables 4-27 and 4-28). Payments to counties from forest product harvests would remain the same as described in Alternative 2 (Tables 4-27 and 4-28).

In conclusion, under Alternative 4 the estimated total number of jobs and labor income associated with BLM land and resource management would be about 198 and $4.2 million, respectively; slightly lower than the other action alternatives due to slight differences in the grazing matrix. These BLM-related contributions, i.e. jobs and labor income, would likely continue to be less than 1 percent of totals within the local economy. The largest employment and labor income effects would occur in the accommodations and food services, agriculture, and retail trade industry sectors (FEAST 2007). Slight differences in jobs and income between Alternative 4 and the other action alternatives are in large part due to treatment of riparian buffers, ecological, and social conflicts in the matrix. While these impacts may be smaller, it must be noted that there may be efficiency gains evident in non-market values not measured in this analysis. For example, water quality and riparian health along the North Fork of the John Day could improve the value of river recreation experiences which might offset losses in the benefit of BLM AUMs to area ranchers.

Role of Amenities, Migration and Non-market Values

Under Alternative 4, no miles of the North Fork John Day River would be recommended as suitable for designation as WSR. This alternative would have the least protection of WSR-related non-market values and natural amenities that are valued by current and new residents to the area.

Social Effects of Alternative 1

Forest Products

Harvests from BLM account for a very small portion of total harvest in the study area. Available forest products under Alternative 1 support what is currently provided, thus current contributions would likely remain unchanged. Public access and the availability of firewood and other forest resources would also remain unchanged. As a result, this alternative would be unlikely to affect current social conditions with respect to forest products.

The action alternatives, would provide fewer estimated AUMS of grazing and fewer CCFs of timber harvest, relative to Alternative 1. Individuals interested in resource protection would prefer the no action alternative as it relates to fuel hazard reduction, however they would find associated impacts to scenery and other resources disagreeable. Individuals and groups interested in resource use would find the higher levels of jobs and labor income associated with this alternative more favorable than the other alternatives, if the harvest estimates

were realistic. However harvest levels under Alternative 2 may be more probable given changes in vegetation management outlined in Chapter 2.

Ranching

Under this alternative the authorized level of AUMs would continue to provide approximately 1 percent of the total forage needed to feed the livestock within the Plan area. While this may seem like an insignificant number, these lands are important to operators because of their relatively low grazing fees, which provide an important complement to other factors of production for area ranchers (see estimate above of the benefit to area ranchers from BLM AUMs). Issues raised by individuals and groups interested in ranching included fire suppression, access and OHV use. Issues related to fire suppression would in large part remain unaddressed under the no action alternative. Current levels of access and OHV use would continue under this alternative, enabling ranchers to maintain their operations as currently managed. Conflicts associated with recreation use, such as vandalism and trash dumping, would likely continue under this alternative.

Access and Travel Management

Concerns were expressed during the public involvement process about decreases in the levels of areas open for motorized use. Relative to the action alternatives, more areas would be open for motorized use under the no action alternative. While motorized users would prefer this alternative, individuals and groups interested in resource protection, non-motorized uses, and area residents would likely least prefer this alternative. Conflicts between motorized users, area residents, and non-motorized users would remain unresolved. This alternative also would not address concerns that the BLM should provide additional motorized recreation opportunities such as rock-crawling and concentrated play area use.

Special Area Designations

Under Alternative 1, no new areas would be managed for Wilderness Characteristics, no new ACECs would be established and no land would be recommended for WSR designation by congress. Therefore, individuals and groups who give high priority to resource protection would be less likely to support this alternative than the action alternatives. Those interested in less government regulation would likely prefer current management under this alternative given the regulation they associate with these land use designations.

Resource Uses

A number of individuals and groups expressed concern about limitations being placed on the availability of public lands for commercial uses such as livestock grazing, mineral development, and forest products. Some comments requested that the RMP focus on beneficial economic and social use of public lands, not locking them up from commercial uses or public access. The current levels, methods, and mix of multiple use management would continue under this alternative, thus individuals and groups interested in resource use would likely favor this alternative.

Social Effects of Alternative 2

Recreation

Alternative 2 emphasizes a balance of motorized and non-motorized recreation and access opportunities compared to the other action alternatives. Seasonal closure in the Lower John Day SRMA would be preferred less by those interested in OHV, hunting and access to BLM. Little Canyon Mountain would be managed for mixed uses with the changes to the North pit likely preferred over Alternatives 4 and 5 by OHV users and changes to the buffer areas less favored. However, non-motorized users and area residents would likely prefer this alternative over alternatives 3 and 4. This alternative would likely provide the most opportunity and resolution of conflict in the Little Canyon Mountain area with consideration of concerns expressed by motorized users, non-motorized users and area residents.

Ranching

Individuals and groups interested in resource protection would prefer Alternative 2 over Alternative 3 since North Fork John Day acquired lands would be given a special consideration for grazing matrix calculations. On the other hand, since allotments along streams are not buffered from livestock grazing, these individuals and groups would likely prefer the other action alternatives. Potential decreases in available AUMs would likely be less preferred by individuals and groups interested in ranching and resource use, however social well being could improve as efficiency gains were made through conflict resolution with the matrix.

Fire Suppression

Concerns from ranchers and area residents about fire suppression would be addressed under Alternative 2. Under existing management and the action alternatives, 2,300 acres of prescribed fire could be used to treat fuels to increase public safety and address resource concerns. Most local residents want fire to be fought as aggressively as possible to protect private property. Under the no action alternative there is no direction for the WUI. Under the action alternatives, prescribed fire in the WUI would be used only for burning piles or broadcast burning in smaller areas where smoke and risk could be managed at acceptable levels. The RMP would tier to the National Fire Plan (USDA *et al.* 2000), which emphasizes the need to reduce hazardous fuels that pose a threat to Communities at Risk. In addition, vegetation management objectives (see Chapter 2) would manage vegetation and fuel loading to trend FRCC condition class towards a condition class less prone to hazardous fire events. Ranchers and area residents would in large part favor the action alternative over Alternative 1 given this new direction that addresses risk to public safety and resources.

Agricultural Lands

If existing management were fully implemented, only 180 acres would be leased. The action alternatives allow up to 400 acres of BLM managed agricultural lands to be leased. The action alternatives would increase the spatial distribution and acreage available for agricultural leases by a small amount.

There are only slight difference in effects to prime farmlands between agricultural land management under Alternative 1 and the action alternatives. Agricultural land management under Alternative 2 and the other action alternatives places more emphasis on allowing fields along rivers to function as floodplains rather than protecting them from flooding. However, the presence of riparian vegetation and other cover will prevent erosive impacts to prime farmlands. Vegetation will slow water velocities and allow sediment deposition along the field. Deposition of fine sediment will increase soil depth and refresh nutrients important for crops. A recreation site is proposed for development in both existing and proposed management, and so there is no net difference between these two alternatives. Appropriate Prime Farmland disclosure will be made during implementation of the recreation area.

Access and Travel Management

Individuals and groups interested in access and motorized recreation would favor the existing situation over Alternative 2 given higher motorized access opportunities provided under Alternative 1 (existing management). Travel on interim routes would be subject to future travel management planning which could increase opportunities for these individuals and groups. Those interested in resource protection and non-motorized uses would likely prefer this alternative over existing management due to adjustments to the transportation system in order to provide protection for soils, water quality, wildlife and other resources.

Special Area Designations

The recommendation of more land under Alternative 2 than 1 for WSRs designation by congress would likely be more preferred by those interested in resource protection. However individuals and groups interested in less government regulation would likely prefer Alternative 1 given the additional regulation they associate with these area designations.

Social Effects of Alternative 3

Ranching

Higher levels of AUMs in Alternative 3 than the other action alternatives suggest those interested in resource use and ranching would prefer this alternative over the other action alternatives. Individuals and groups interested in resource protection would prefer Alternative 3 over Alternative 2 given that some streams are buffered by 1/8 of a mile. However since North Fork John Day acquired lands are not given a special designation for Grazing Matrix calculation, the other action alternatives would be preferred by these groups.

Recreation

Alternative 3 emphasizes mixed recreation use with a slight emphasis towards motorized uses. OHV users would also likely prefer seasonal cross-country motorized use authorized on the Rudio Mountain plateau under this alternative compared to the limited designation under Alternatives 4 and 5. Individuals and groups interested in resource protection and non-motorized use would thus prefer the other action alternatives over Alternative 3. In the Little Canyon Mountain area, limited use designations in the North pit and buffer areas would likely be preferred by OHV users over the other action alternatives. Non-motorized users and area residents would likely favor the other action alternatives over Alternative 3 for Little Canyon Mountain.

Access and Travel Management

Individuals and groups interested in access and motorized recreation would likely prefer Alternative 3 over all other alternatives given a greater degree of motorized access opportunities.

Social Effects of Alternative 4

Ranching

Under Alternative 4, lower levels of AUMs than the other alternatives suggest those interested in resource use and ranching would likely prefer the other alternatives. However social factors would be more heavily weighted which might provide additional resolution of access and recreation conflicts than the other action alternatives. Individuals and groups interested in resource protection would prefer this alternative over the others given the combination of both the special designation of North Fork John Day acquired lands, buffering along fish streams, and since ecological factors are more heavily weighted.

Recreation

Alternative 4 emphasizes mixed recreation use with a slight emphasis towards non-motorized uses. This alternative would likely be favored by non-motorized users and those interested in resource protection based on seasonal closures and limited area designations. OHV users would prefer Alternatives 2 and 3 under which would allow open cross-country motorized use on the Rudio Mountain plateau. Little Canyon Mountain would be managed for mixed uses with closure to the North pit and would likely be less preferred than Alternatives 2 and 3 by OHV users. However non-motorized users and area residents would likely prefer this alternative over Alternative 3.

Social Effects of Alternative 5

Economic and social effects relevant to Alternative 5 are discussed under Effects Common to Action Alternatives. Only the social effects of Recreation are thus discussed since these are the only management actions unique to Alternative 5.

Recreation

Alternative 5 would likely be the most favored by non-motorized users and those interested in resource protection.

These groups would prefer Alternatives 2 and 3 under which the Rudio Mountain plateau would allow open cross-country motorized use. Management on Little Canyon Mountain would be least preferred by OHV users however non-motorized users and area residents would likely prefer this alternative over all the other alternatives.

Other Effects to Social and Economic Conditions

By 2016, non-farm related employment in Gilliam, Jefferson, Morrow, Sherman, Umatilla, Wasco, and Wheeler counties is projected to increase by 12 percent. In the Grant, Harney, and Malhuer county region, non-farm related employment is projected to increase by 11 percent (OLMIS 2007). In these same two regions, the population is projected to increase by 13 and 8 percent, respectively, by 2015 (State of Oregon DAS, 2007). From these numbers we might infer a few things about employment and changes in the labor force. If population increases are outpaced by employment increases there may be more retirees and theunemployed moving into the area or the aging labor force would not be replenished with younger workers.

This assertion is reflected in population projections by age groups provided by the Oregon Office of Economic Analysis. Between 2005 and 2015, the retirement age population (ages 65+) in the Gilliam, Jefferson, Morrow, Sherman, Umatilla, Wasco, and Wheeler county area is anticipated to increase by 37 percent while ages that make up the labor force (ages 20 to 64) increase by 24 percent. Similarly in Grant, Harney, and Malheur counties the retirement and labor force population is expected to change by 18 and 10 percent, respectively.

When the geographic area of interest is focused on just those counties completely contained within the plan area (Gilliam, Grant, and Wheeler counties) retirees, the labor force, and the younger age groups will make up larger, similar and smaller portions of the total population, respectively. Retirees will make up 19 percent of the total population in 2005 and increase to 22 percent by 2015. The labor force population made up approximately 56 percent of the total population in 2005 and will change to 57 percent by 2015. In 2005 youth and young adults (aged 10 to 24) made up 19 percent of the population, while they are projected to comprise only 15 percent in 2015. These changes reflect trends seen in existing demographic data; the younger generation is moving out as the population continues to age.

Wood products are an important part of the economy and lifestyles within the plan area. As discussed in Chapter 3, BLM forest product harvests have comprised a small, but an increasing share of the total volume harvested in the area. This is due in large part to decreased harvests on national forests throughout the region. If current trends continue BLM harvest could continue to provide a small yet important part of total forest products to the area. Declines in lumber prices connected to larger national and international trends may put pressure on mills and logging operations to further slim operations. Niche markets for specialized forest products may become increasingly important. One manufacturer in John Day has developed a niche for blued pine, and another has a cogeneration plant.

Interest in niche markets was frequently brought up during the public involvement process. In addition to forest products, organic beef and wind energy development are expanding in the plan area. Further investment in organic beef will occur as a slaughtering facility in Grant County is installed, which will employ more than 20 people. Three wind projects producing 360 MWs of power are proposed in the study area (on private land) that would also contribute to area employment and income. Wind energy development on BLM land in the plan area may occur but is highly speculative. Predicting the investment and development in other niche markets is similarly conjectural. However BLM has made every effort to enable future development of niche markets and alternative energy throughout the action alternatives. These projects would add to area employment and labor income while this plan would ensure values not traded in markets such as scenery, biodiversity, and solitude would be protected.

In conclusion, employment and demographic changes in the area suggest trends in social and economic well-being will continue. While employment and labor income contributions from BLM management to area totals are small, the land managed by BLM sustains area well-being and will continue to do so under all alternatives. This occurs largely through the provision of natural amenities and recreational opportunities that attract tourists, businesses, and maintain quality of life. None of the alternatives will alter the trends outlined above but will provide opportunities for value added businesses in niche markets, recreational opportunities to a variety of demographic groups, and sustain quality of life for area residents and tourists who value the area.