







## AFFECTED ENVIRONMENT

emergency situation the BLM has not fully studied and reported the results of the effort. The State Archaeologist, who conducted part of the salvage has reported his results and they are due to be published soon (Miller 1998).

Perhaps the most important information gleaned from the CK Adams site is that stratified sites dating from the late prehistoric period through the archaic period should be expected in the Pacific Creek drainage basin. This portion of the planning area contains buried soils that are being cross-cut by modern drainage channels including Pacific Creek. In some cases, like at the CK Adams site, archaeological manifestations are being exposed by stream cutting. The stable soil deposit in the Pacific Creek basin seems somehow associated with the Killpecker dune field, but the nature of that association is not fully understood. However, while sites along Pacific Creek do hold archaeological deposits back to about 7,000 years they do not appear, from present evidence, to have PaleoIndian deposits (e.g., from 7,000 to 12,000 years before present). Nonetheless, stratified deposits are the best source of information about changes in human behavior over long periods of time. Thus, sites like the CK Adams site, which are to be expected in this portion of the planning area are quite significant. Furthermore, previously discussed issues regarding archaeological materials not being evident from observations of the modern surface also apply in this region.

Yet another kind of archaeological manifestation observed in the planning area is represented by the proto-historic Eden-Farson site (Frison 1971). This site sits on top of the stable soil deposit in the area where the Finley and Krmpotich sites are located, rather than being buried within those soils. The Eden-Farson site contains archaeological evidence of a large hunter-gatherer winter encampment including remains of winter shelters, pottery, and a wide array of stone tools and bones from antelope which were apparently a major portion of the people's winter food supply.

Radiocarbon dates from the Eden-Farson site indicate that the site was probably occupied immediately before Euro-Americans first came into direct contact with Native Americans in this region (about 200 to 300 years ago). No Euro-American artifacts were recovered from the Eden-Farson site. It is assumed that direct contact between these cultures had not occurred, in this region, at the time the Eden-Farson site was occupied even though Europeans had been on the North American continent for nearly 300 years prior to the dates of the site. However, journals (Morgan 1964) from early Euro-American traders including William Ashley's men, especially Jedediah Smith, mention the presence of two large Native encampments in this region. Smith identifies one camp as Crow and the other as Shoshone.

University of Wyoming archaeologist George Frison (1971) postulates that pottery recovered from the Eden-Farson site was made by Shoshone people. Whether this is the camp described by Jedediah Smith is impossible to say, but we do know that several Native American tribes were present in this region in the late Eighteenth and early Nineteenth Centuries including the Shoshone, Ute, Bannock, Crow, Blackfoot, and Arapaho. A few years later numerous tribes from the Northern Plains, Great Basin, and Columbia Plateau and European

Americans participated in fur trade rendezvous throughout the central Rocky Mountains. Many rendezvous were held along the Green River within a hundred miles of the planning area. There is speculation among anthropologists (Wood 1980) that the Euro-American traders simply 'tapped into' a vast Native American trade network, one center of which was located in what is now southwestern Wyoming. It is also likely that other groups including Athapaskan-speaking ancestors of the modern day Navajo and Apache people of the Southwest passed through this region only a few hundred years before Europeans arrived in North America.

Archaeological manifestations of any or all of these diverse Native American cultures should be expected in the planning area. The White Mountain Petroglyphs site, in the southwest corner of the planning area, contains historic and prehistoric images carved into rock. Images of human figures in several different styles may indicate some time depth to the site although all of the rock art is thought to have been drawn in the past 500 or so years (Tanner and Vlcek 1995), or during what archaeologists call the Firehole Phase. Not surprisingly, Native American traditional elders have expressed interest in the White Mountain site and several other rock art locations in the greater Killpecker Creek area. Some management strategies recommended by traditional elders were incorporated into the Green River Resource Management Plan (RMP).

Administratively, the White Mountain Petroglyphs site and surrounding viewshed for 1/4 mile is protected. An existing two-track road going beyond the petroglyph site and to the top of White Mountain has been closed, although attempts to physically effect the closure have not been entirely successful. A cultural resource management plan for the site is required by the Green River RMP, but has not yet been written.

Traditional elders have also expressed interest in several landforms including Steamboat Mountain and Boars Tusk within the planning area, and North and South Table Mountains immediately to the south, and Pilot Butte west of the planning area. Consultation visits with traditional elders indicate that these landmarks, and the landscape vista of which they are a part, are associated with the physical remains of a number of "respected places" associated with Native American religious practices.

The exact locations of these sites and the religious practices they represent are kept confidential at the request of tribal elders. However, at least some of the sites are probably Traditional Cultural Properties warranting special protective measures in compliance with the National Historic Preservation Act, the American Indian Religious Freedom Act, and Executive Order 13007.

During field visits several areas were also identified having landscape characteristics that typically are associated with respected sites. These areas have been roughly delineated; however, no attempt has been made to identify specific sites that may be of concern to traditional Native American peoples. Planning for development within the identified areas should include field inventory involving tribal representatives to identify respected sites. Consultation should be initiated with



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to cross over the Western Wyoming Ranges and into Idaho. As mentioned, there are several other trail variants, but none are within the planning area.

The National Historic Trails system is administered by the National Park Service. However, management of Federal lands containing Congressionally recognized trails resources is left to those agencies that have jurisdiction over the lands upon which the trails occur, in this case the BLM. The BLM approved the Oregon/Mormon Pioneer National Historic Trails Management Plan in 1986, which governs management of these resources in consultation with the Wyoming State Historic Preservation Office and the National Park Service.

The significance of South Pass in the development of the United States as a nation was cause for the area's designation in 1959 as a National Historic Landmark. The process of recognizing historic American places was in its infancy at that time and the National Historic Preservation Act would not be implemented for several more years. For that reason no attempt was made to designate precise boundaries for the South Pass National Historic Landmark for another quarter century.

The National Park Service proposed a boundary encompassing about 5,500 acres, in 1984. The proposed area included nearly 1,000 acres of privately owned land. Local landowners fearing the preservation mandate of the National Park Service protested the proposal which was eventually never pursued by that agency. Since all federally owned lands in the area are under the jurisdiction of the Bureau of Land Management, it fell to that agency to develop management prescriptions designed to protect the South Pass National Historic Landmark.

To ensure that the intent of the Congressional National Historic Landmark designation for those lands on the western slope of South Pass was not compromised, the BLM developed the South Pass Historic Landscape within the Green River RMP (USDI 1997). Management prescriptions for the South Pass Historic Landscape ACEC prohibit development that would be visible within three miles of the historic trails corridor. Geographic Information System (GIS) analysis of this area (viewshed) was conducted to determine what lands are visible from the historic trails corridor. GIS analysis of the vista indicates that within an arbitrary three-mile distance from the main National Historic Trail corridor about 24,000 acres are visible from the trails, while about 26,000 acres are shielded from view by topography. The Green River RMP sets forth special management prescriptions for the South Pass Historic Landscape and concentrates protective management upon areas visible from the trails corridor.

Immediately following the Civil War, a rather significant discovery of gold was made in the South Pass region. By 1869, hundreds of prospectors had converged on the area and several small communities had developed. The most important of the settlements was South Pass City which today is a State Historical Park. Since the transcontinental railroad had just been completed between Omaha, Nebraska and Sacramento, California, commerce with the new gold fields could be linked with the larger national economy much more easily than the earlier historic trails network. However, this cer-

tainly did not mean that wagon roads were obsolete. Indeed, a network of roads soon developed to connect railheads on the Union Pacific Railroad in southern Wyoming with the South Pass region.

By 1870, roads to the gold fields were started from three railheads on the Union Pacific-Point of Rocks, Green River, and Bryan. These became the earliest of what are called Expansion Era roads that linked communities along the railroad with newly developing mining, agricultural, and military settlements in the hinterlands of the central Rocky Mountains. Physical evidence of the three "Expansion Era" roads to the South Pass region cross the planning area as do roads to ranching communities (like New Fork in the upper Green River Basin). Expansion Era roads also run through the planning area from Rock Springs to military posts established to administer the Wind River Indian Reservation. Several stage stations and freighter's camp locations associated with these expansion era roads are known including Freightier's Gap, Fourteen Mile, and The Wells within the planning area.

During this expansion era, the planning area's namesake, Jack Morrow, entered the region. Very little historical information is available about Jack Morrow. However, one quote from this limited information may sum up what we know of Jack,

"Morrow started his career on the Plains as a common thief but his activities, as he became older, carried him into the upper brackets of swindling.....In a few years his eccentric ways of wasting money and his stupendous drunken sprees became legend from Omaha to the mountains and the mining towns. Then, after he had killed a man in a gun fight, his reputation as a bad man was established." (Miller 1962).

Soon after the expansion era road network began to develop, cattle ranching became important to the region's economy. Several early ranching related historic sites are within the planning area. The best known of these is the old Halter and Flick Ranch at Pacific Springs which is on private land. Pacific Springs was also an important watering spot on the historic trails corridor. The best preserved ranching related site on BLM lands is the Crookston Ranch, which includes several historic structures. The Green River RMP designates this site for special management for the interpretation of the region's ranching history. Numerous other, less impressive sites related to the history of pastoral agriculture including small mostly unsuccessful homesteaders sites, sheepherder camps and shearing corrals, horse trapping facilities, and irrigation systems to support production of wild grass hay, are represented in the planning area. The stone building at Rock Cabin Creek, the Chilton and Houghton Ranch sites, the Washington Homestead, and Charlie Jameson's horse trap and cabin are examples. However, the most ubiquitous agriculture related site is the common sheepherder, or cowboy campsite which today consists only of a small scattering of historic artifacts across the landscape.

Although the generalities of the region's Expansion Era history (1870-1940) are known, no contextual study of this aspect of local history exists within which historic resources



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Steamboat Mountain contains unique vegetative communities and high value wildlife habitat. The Steamboat Mountain vegetative communities include associations of sagebrush with Utah snowberry and basin wildrye, bluebunch wheatgrass, and lemon scurfpea. In these communities, the primary resource management objective is to protect wildlife habitat. Generally, wildland fire is not desired in the Steamboat Mountain area, although there may be opportunities for the use of prescribed fire. The BLM would attempt to confine or contain wildland fires to less than 5 acres in the Steamboat Mountain area because of important wildlife habitat. Use of prescribed fire would be the preferred method to meet resource management objectives (USDI 1998b).

Restrictions would be applied to the use of heavy equipment and other minimal impact suppression techniques would be followed in ACECs, WSAs, and along historic trails. In particular, "light on the land" techniques and restrictions on motorized and mechanized equipment may be applied to fire activities in WSAs. Restrictions on the use of chemical and dye retardants would be followed in the vicinity of petroglyphs.

Fire frequency in the Big Sandy and Steamboat Mountain area has been moderate with 27 fires recorded in 10 years, burning about 860 acres.

The Red Desert fire management area encompasses the portion of the Red Desert Watershed that is found within the planning area boundary. The resource management objectives for this area are to improve wildlife habitat, improve forage for livestock and wild horses, reduce conifer encroachment into aspen and mountain shrub communities, and promote healthy timber regeneration.

Restrictions on the use of heavy equipment and other minimal impact suppression techniques would be followed in ACECs and WSAs. Constraints to protect watershed and scenic values would apply too. In particular, "light on the land" techniques and restrictions on motorized and mechanized equipment may be applied to fire activities in WSAs.

Fire frequency in the Red Desert area has been low with two fires recorded in 10 years burning about 31 acres.

## GROUNDWATER

The planning area lies within portions of two basins, the Great Divide Basin and the Green River Basin. The Wind River Range marks the northern boundary of both basins, and the Rock Springs Uplift hydrographically separates the two within the planning area. In general, groundwater flows from the elevated basin periphery (recharge area) to the lower basin centers (discharge area) under both unconfined and confined groundwater conditions. Where groundwater is overlain by permeable material extending upward to the land surface, unconfined groundwater conditions exist. However, at depth groundwater can be confined by overlying impermeable rock, creating confined or artesian conditions. Away from the basin periphery, locally elevated areas, such as Steamboat Mountain, and the highly permeable Killpecker Dunes provide the right conditions for locally fed seeps and springs to occur.

Groundwater aquifers are not well defined in either basin

because of the sporadic nature of occurrence in each geologic layer. However, limited information is available from development of water wells for domestic, livestock, and agricultural use and from oil and gas development. On the Green River Basin side of the Rock Springs Uplift in the Eden-Farson area, a number of water wells have been known to produce or still produce from the Tertiary, Laney Member of the Green River Formation. South of Eden, a couple of wells produce from the Tertiary, Tipton Member of the Green River Formation. Farther to the west, in T. 26 N., R. 103 W. and T. 27 N., R. 101 W., at least two water wells have produced from the Tertiary, Wasatch Formation. In the South Pass area, one water well is known to have produced from the Tertiary Undifferentiated. On the Great Divide Basin side of the Rock Springs Uplift, groundwater data indicate usable water in the Tertiary, Wasatch Formation and Tertiary, Laney and Tipton members of the Green River Formation (Collentine, et al. 1981).

Water from the Cretaceous, Almond, and Ericson formations, at shallow depths on the Rock Springs Uplift, is usable for livestock, irrigation and/or domestic use. Other stratigraphic units that may have usable groundwater within the planning area include the Tertiary, Bridger Formation and, where it crops out, the Lewis Formation (Cretaceous). Quaternary sand dune deposits are likely to contain usable water, but more importantly may act as a recharge zone for underlying aquifers and produce seeps and springs used by wildlife. Quaternary volcanic lava flows may also have springs and seeps of usable water.

Water quality standards for domestic, agricultural, and livestock uses can be found in Table 3-1. Very few of the constituents in Table 3-1 have been monitored with any frequency within the planning area. Available water quality data is taken from the Water Resources Research Institute's evaluation of the occurrence and characteristics of groundwater in the Green River and Great Divide Basins (Collentine, et al. 1981).

In general, water quality in both basins decreases away from the basin margin and with increased depth. Quality may also decrease in heavily faulted areas due to the inability of the groundwater to circulate and/or the upward migration and comingling of lower quality water with higher quality water. In both basins, the highest quality water would be expected in Quaternary deposits of alluvium along major drainages, Quaternary dune fields, Cretaceous and Tertiary sediments along the basin margins, and in the fine to medium grain sandstones of the Wasatch Formation away from the basin margin.

On the Green River Basin side of the Rock Springs Uplift, the major ion composition in the Wasatch Formation changes from calcium bicarbonate to sodium bicarbonate to sodium sulfate in a down gradient direction or away from the basin margin (Collentine, et al. 1981). The most dramatic change in major ion composition occurs where the Wasatch Formation intertongues with the Laney member of the Green River Formation, which typically has a major ion composition of sodium sulfate. On average, the Laney Member aquifer is higher in total dissolved solids (TDS-ranging from 2,000-7,000 mg/l) than the Wasatch Formation (TDS-ranging from



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### Proposed Withdrawals

The Green River RMP (USDI 1997) decided that the following withdrawals be processed:

- a. Greater Sand Dunes ACEC: 23,870 acres
- b. South Pass Historic Landscape: 4,790 acres (actual acreage to be determined upon consultation with other parties of interest).
- c. Steamboat Mountain Area: (actual acreage to be determined upon completion of site specific management plans).
- d. Tri-Territory Marker: 10 acres
- e. Special Status Plants: 2,680 acres
- f. Crookston Ranch: 40 acres
- g. Public Water Reserves: 5,900 acres

### Access/Transportation

Several unpaved county roads crisscross the area providing access to recreational areas and private landholdings.

The BLM transportation system serves resource programs. BLM-maintained roads provide access to range improvements, recreation areas, community pits, etc.

Access needs: Bush Rim (sec. 36, T. 24 N., R. 102 W.) and White Mountain Petroglyphs (sec. 19, T. 22 N., R. 104 W., and sec. 13, T. 22 N., R. 105 W.).

## LIVESTOCK GRAZING

Livestock grazing is authorized in 16 grazing allotments (see Table 3-2) on approximately 574,800 acres of BLM-administered public lands, 15,830 acres of private, and 29,720 acres of State lands in the planning area. There are 35 livestock operators permitted to graze livestock within this planning area. Most allotments contain some lands unsuitable for livestock grazing and areas suitable only for certain classes of livestock. The allotments within the planning area, either partially or wholly are: 4th of July, Pacific Springs, Johnson Place, Crookston Ranch, Hay Meadow, Pacific Creek, Bar X, Continental Peak, Red Desert, Bush Rim, Steamboat Mountain, Sands, Rock Springs, Middle Hay, Chilton Place, and Houghton Ranch (Map 41).

Livestock grazing on BLM-managed public land in the planning area is authorized under section 3 of the Taylor Grazing Act of 1934. "Section 3" permits authorize grazing on lands inside of grazing district boundaries. The current authorized preference within the Jack Morrow Hills planning area is 22,767 cattle AUMs and 3,265 sheep AUMs (see Table 3-3).

Due to changes in available forage, environmental conditions, business decisions by operators, and livestock prices, livestock grazing in the Jack Morrow Hills area has varied over time. Total permitted use for the area was 26,032 AUMs (22,767 cattle and 3,265 sheep). Yet the actual use for the last

five years (1993-97) averaged 9,851 AUMs (8,861 cattle and 990 sheep). However, grazing use has trended up since 1997 with actual use for the baseline year of 1998 at 13,038 AUMs (11,991 cattle and 1,047 sheep) (see Table 3-4).

Congress has enacted a yearly fee allowing grazing on public lands (43 CFR 4130.8-1). This amount changes with the economic cost of producing livestock. It is based on the value of livestock, the base economic value of grazing on public rangeland established by the 1966 Western Livestock Grazing Survey, livestock production costs, and the average costs of grazing on private lands. The 1998 grazing fee is set at \$1.35 per AUM.

Surcharge rates are rates charged a non-permittee for livestock grazing on public lands (43 CFR 4130.8-3(d)). This means that if a livestock operator doesn't have a valid permit, he or she may enter into an agreement with another operator who has a grazing permit. The cost for this surcharge in 1998 was \$3.73 plus the grazing fee of \$1.35 for a total of \$5.08 per AUM.

The rangeland program in the planning area emphasizes multiple use management of forage for livestock and wild horses, and incorporates needs for wildlife habitat and protection of riparian and watershed values. The specific goals and objectives of the program have and are being accomplished through careful planning at the activity level, with attention given to proper placement of rangeland improvements, distribution of livestock, kind and class of livestock, season of use, suitable grazing systems, plant and animal requirements, and vegetative land treatments.

A number of range improvement projects have been constructed both for the enhancement and protection of watershed and wildlife values and for the management of domestic livestock grazing. These projects consist of; water developments, vegetative manipulations, windmills, and fences. Map 42 displays all of the range improvement projects in the planning area. All projects have been authorized under cooperative agreements or permits, depending on overall benefits and objectives and private investment levels. The construction of range improvement projects in conjunction with a suitable grazing system began and has continued primarily in high priority allotments.

Since the creation of the Green River Resource Area in 1986 (now called the Rock Springs Field Office), rangeland monitoring efforts under way in the Big Sandy and Salt Wells Resource Areas have continued. Appendix 9-5 of the Green River RMP reflects the type of monitoring information that has been collected in each allotment. In the Sandy EIS area, which encompasses the planning area, a majority of the monitoring studies were established between 1981 and 1984, primarily in allotments with completed Allotment Management Plans (AMPs). These studies included actual use, vegetative utilization, rangeland condition and trend, and precipitation.

The rangeland monitoring effort for the Salt Wells-Pilot Butte EIS area began during the 1984 field season. The high priority allotments were given first attention, followed by the lower priority allotments.



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### General Geology

The main part of the Green River Basin is a large structural and topographic basin (Figure 7) drained by the Green River and its tributaries. The floor of the basin lies between 6,000 and 8,000 feet (1,820 to 2,430 meters) above sea level, and is primarily a flat to gently rolling plain. The outer margin of the Green River Basin is defined by a series of escarpments formed by tilted beds of the Green River and Wasatch formations (Bradley 1964). North of the town of Green River, the main escarpment forms a conspicuous bluff, known as White Mountain, that extends northward into the western part of the planning area.

Three watersheds are represented in the planning area (Map 43). The main drainages in the western part of the planning area are Killpecker Creek, Jack Morrow Creek, and Pacific Creek. All are part of the Green River watershed, which is part of the Colorado River Basin. Small streams on the north edge are part of the Sweetwater River watershed, which is part of the Missouri River Basin. That area of the planning area south and east of the continental divide lies in the Great Divide Watershed. This watershed is part of the Great Divide Basin which has internal drainage due to splitting of the continental drainage divide around this basin. Most streams flow east toward the center of the basin and no precipitation leaves as surface runoff.

The widespread erosion that has shaped the planning area has resulted in the development of considerable areas of badlands. The main area of badlands is within the Honeycomb Buttes and Oregon Buttes WSAs. Badlands are best developed in soft, weak, mudstones, which are relatively impervious and preclude infiltration of rain water. As a result, runoff erodes intricate networks of rills and gullies. As the gullies deepen, the ground surface becomes highly dissected.

The vast majority of surface rocks in the planning area are uncut by faults. The Continental Fault is approximately 55 miles (88.5 kilometers) long (Bradley 1964) and roughly parallels the buried thrust fault (Wind River thrust fault) at the north edge of the planning area (Figure 7). It begins east of the Field Office area and passes between South Pass City and Oregon Buttes.

The Rock Springs Uplift (Figure 7) is a broad, elliptical anticline that began to form after the Lance Formation was deposited in the Late Cretaceous (Roehler 1965). Erosion has uncovered a sequence of Tertiary and Upper Cretaceous rocks. The rocks exposed on the uplift are cut by a number of faults and data indicate that the west flank of the uplift is bounded by a thrust fault that does not reach the surface (Love and Christiansen 1985; Bradley 1964). The planning area straddles the northern plunge of the uplift.

The Leucite Hills, at the north end of the Rock Springs Uplift, are the remnants of a Quaternary volcanic field. They form a series of buttes that rise precipitously above the surrounding plains. Steamboat Mountain is capped by lava flows and Boars Tusk is the remnant of a volcanic neck. These two features lie within the planning area.

At the far northern end of the Rock Springs Uplift and on the south part of the planning area, is an extensive dune field

called the Killpecker Dunes. This dune field is at the western end of a narrow belt of dunes that stretches 150 miles (240 kilometers) to the east. The outer margins of the field are occupied primarily by dormant dunes, while active dunes are found in the central portion of the field.

The Great Divide Basin is a structural basin (Figure 7) underlying a topographic and internally drained basin (Love 1961). The Continental Divide splits near the southeast end of the Wind River Range and converges again at the north end of the Sierra Madre Mountains. Lake, swamp, and stream deposits of Tertiary age make up most of the bedrock and surficial deposits are predominantly soft and weak, causing the basin to be nearly flat and featureless, with occasional intermittent lakes and dry flats in the lowest areas. The youngest features are the Killpecker Dunes which extend across this basin.

The dominant feature of the southern Wind River Range in the planning area is a very gently dipping erosion surface comprised of Tertiary sediments (Bayley, et al. 1973). This surface blends the Precambrian core of the range with the Rock Springs Uplift and Green River Basin to the south and southwest. Relief in these foothills is 300 to 500 feet (90 to 150 meters). This range is one of the most spectacular of the Precambrian uplifts in the state. It is basically a huge block of granite that has been moved by faulting south-westward over the Green River Basin. This fault is called the Wind River thrust fault and is covered by sediments on its southern end where it extends into the planning area.

### Oil and Gas Geology

#### Historical Background

Between 1900 and 1916, a number of shallow wells were drilled on the Rock Springs Uplift in search of oil. A number of oil and gas shows were encountered but no wells were productive. Additional work began in the 1920s with the first discovery being the South Baxter Basin field in August of 1922. Drilling activity has occurred almost continuously since this discovery and has resulted in the location of a large number of gas and oil fields along the axis of the Rock Springs Uplift.

The first test in the planning area was the Boars Tusk Oil Company #1 (sec. 16, T. 23 N., R. 104 W.) abandoned in 1927. Thirteen more nonproductive wells were drilled and abandoned before the first producing well was completed in 1961. Trigood Oil Company drilled the first Frontier Formation producer in sec. 17, T. 23 N., R. 103 W. The well later added production from the Dakota Formation.

Exploration and development continues today. Through August 31, 1997, there have been 153 wells completed in the planning area. Information on these wells is presented in Table 3-6. Additional information about those wells that have produced can be found in the RFD (on file in the Rock Springs Field Office). Methods and procedures to conduct geophysical exploration leasing, well permitting, drilling operations, development, production, and subsurface practices are described in Appendix 9.







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### Diamonds

Besides gold occurrences in the northeastern portion of the planning area, there is the potential for diamonds to occur in association with the Quaternary volcanic rocks (lamproites) found in the southern part of the study area. Though no diamonds have ever been recovered from these lamproites, they exhibit characteristics similar to diamondiferous lamproites found in Arkansas, Western Australia, and India.

Additional exploration is needed to further define these structures and to search for diamonds. Either detailed petrographic and geochemical analyses or larger sample volumes will be necessary to make this determination. It is anticipated that such exploration may occur during the planning period. About 2 acres of disturbance is anticipated from these activities.

### Uranium

Wyoming has been a major producer and reserve holder of uranium in the United States (Harris and King 1993). Harris and King report that almost every stratigraphic unit and every county in the state contains uranium mineralization. The largest and most important deposits of uranium occur outside the planning area in the Gas Hills, Shirley Basin, Crooks Gap, southern Powder River Basin, and Pumpkin Buttes uranium districts. In the northern part of the planning area, the U.S. Geological Survey (Patterson, et al, 1987) reports the occurrence of uranium within coal beds of the Wasatch Formation (Tertiary) and possible deposits within the conglomeratic lenses of the Cathedral Bluffs Tongue (Wasatch Formation). Uranium exploration has occurred on claims staked in the northern part of the planning area and south of the planning area around the Rock Springs Uplift. These claims were located over the Rock Springs Formation and/or Ericson Formation of the Cretaceous Mesaverde Group. The potential for development of uranium within the planning area is very low. No development activity is projected during the planning period.

### Salable Minerals (Mineral Materials)

#### Sand and Gravel

Lands open to development of salable minerals within the planning area lack good quality construction material, except for Steamboat Mountain which is capped by volcanic lava. The South Pass Historic Landscape, the Sweetwater River and 1/4 mile buffer, and the Sand Dunes contain quality construction materials. However, the Green River RMP (USDI 1997) prohibits development of salable minerals in these areas. Areas closed to development of salable minerals within the planning area are listed below: Boars Tusk; Oregon Buttes ACEC; Greater Sand Dunes ACEC; South Pass Historic Landscape ACEC; South Pass Historic Landscape (about 4,970 acres); Steamboat Mountain ACEC (pending completion of the site specific implementation plan); Occupied Raptor Nests; Special Status Plant Species Sites; Crookston Ranch, Rock art sites (including the White Mountain Petroglyphs ACEC), and Wilderness Study Areas.

Nearly all material used for construction and maintenance of designed gravel and paved roads comes from outside the planning area. The exception is a Wyoming Transportation Department borrow site along Wyoming Highway 28. About 4 acres of disturbance has occurred at this site. South of the planning area along the Tri-Territory Road is the Long Canyon community sand and gravel pit. Gravel deposits of marginal quality occur southeast of the planning area along the Bar X Road.

#### Clay

The Cretaceous Lance Formation, Lewis Shale, and Mesaverde Group could contain clays and shales usable in structural clay products (Construction Materials Survey 1965). Potential products include brick tile, sewer pipe and other items used in construction. Little testing of these clays and shales has been conducted. The sediments containing the potentially usable clays occur in the southern portion of the planning area. The potential for development of clays is very low given the existing land use restrictions and abundance of clay elsewhere. No activity is projected during the planning period.

#### Geologic Hazards

Several types of geologic hazards are present in the planning area (Map 49). Hydrogen sulfide, earthquake, landslides, and windblown sand hazards are of primary concern. Geo/Resource Consultants (1984) prepared an analysis of these hazards, with the exception of the hydrogen sulfide hazard.

Hydrogen sulfide is present with the hydrocarbons in some deep producing oil and gas wells further south on the Rock Springs Uplift and could be present in the planning area in formations deeper than those that presently produce hydrocarbons. Exposure to small quantities can cause death. Additional discussion of this hazard is on file in the Rock Springs Field Office (USDI 1992).

Active faulting is limited to the Continental fault area on the north perimeter of the planning area. Historical seismicity shows no major earthquakes within the planning area. However, earthquakes in adjacent regions may directly affect this area.

Landslides are scarce in the planning area, due to the relatively arid climatic conditions and the competent rocks underlying most steep slopes. The area of steep slopes around Steamboat Mountain and Oregon Buttes has the most potential for landslides or rock falls.

Windblown sand deposits occur throughout the southern part of the planning area. The Killpecker Dune field encompasses about 170 square miles, extending beyond the planning area boundary. Prevailing wind direction is from the west-northwest and dune migration follows prevailing winds. Hazards are increased when dunes are migrating.

No volcanic hazards exist within the area (Wright and Pierson 1992).



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outstanding motorized and non-motorized recreational values which have the potential of increasing significantly. In 1983, an ACEC management plan was completed and this plan also serves as the Recreation Activity Management Plan for the area. The existing off-road vehicle parking and camping area was built in the mid-1980s and needs to have a project plan completed to address visitor conflict concerns. The Crookston Historic Ranch also is in need of a project plan to address resource concerns.

### **Oregon/Mormon Pioneer/California/ Pony Express National Historic Trails**

After the Sand Dunes discussion add as a heading Oregon/Mormon Pioneer/California/and Pony Express National Historic Trails followed by this discussion. “A complete discussion of the Oregon-Mormon Pioneer National Historic Trails special recreation management area can be found in the Oregon-Mormon Pioneer National Historic Trails Management Plan (USDI 1986). In 1999, a comprehensive management and use plan was developed by the National Park Service for the California/Pony Express National Historic Trails as well as an update to the Oregon/Mormon Pioneer National Historic Trails Management Plan. The SRMA is managed for a range of visitation intensities from dedicated trail buffs in four-wheel-drive off-road vehicles to the transient visitor in a family vehicle simply passing through the area.

### **Continental Divide National Scenic Trail**

The Forest Service published a comprehensive management plan for the trail in 1985. The plan set broad goals and policy for local trail management. In 1998, BLM issued an Environmental Assessment for the designations of the proposed on-the-ground route for the trail. The Continental Peak/South Pass Connecting Side Trail (35 miles) was proposed and analyzed. However, designation of the route was deferred pending completion of the Jack Morrow Hills EIS to analyze the side trail along with other related resource issues.

On October 2, 1968, Congress passed the National Trails System Act. This Act called for the establishment of a system of national scenic trails “which will be extended trails so located as to provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas through which such trails may pass.” As a result of the 1978 amendment to this Act, Congress designated the Continental Divide National Scenic Trail (CDNST) as part of the National Scenic Trail system. The CDNST is a trail route traversing the length of the Rocky Mountains, in close proximity to the Continental Divide for approximately 3,100 miles, through the states of Montana, Idaho, Wyoming, Colorado, and New Mexico.

A part of the CDNST is identified in the planning area. About 25 miles of existing roads and routes have been identified as a side trail for the CDNST. This route would partially occur in the South Pass Historic Landscape area (Map 51).

There are two Backcountry Byways identified in the planning area. The Tri-Territory Loop Backcountry Byway lies completely in the planning area while the Red Desert Backcountry Byway lies partially in the planning area. There are opportunities for interpretive sites along these byways to provide information and scenic views of the planning area.

### **Recreation Opportunity Spectrum**

Public lands are managed to provide a broad spectrum of recreational opportunities. The recreation opportunity spectrum system provides the BLM with a framework for determining existing outdoor recreation opportunities and management potential, based upon a combination of activity, setting, and experience.

“The recreation opportunity spectrum is divided into six management classes which are described in Table 3-10 and shown on Map 52, if applicable. The recreation opportunity spectrum system describes probable physical settings, experiences, and activities for each class and identifies where these combinations occur within the planning area, but also allows flexibility. The use of this system on public lands will help recognize and meet the public’s growing demand for a wide variety of recreation activities and setting within the planning area.

## **SOCIOECONOMICS**

### **General Setting**

The planning area is located in southwest Wyoming and can be characterized as remote with very little development. The planning area sits in the north-central portion of Sweetwater County; however, small segments of the planning area affect Fremont and Sublette Counties. Therefore, the economies of Sweetwater, Sublette, and Fremont Counties will be discussed.

### **County Amenities**

#### **Sweetwater County**

Sweetwater County has one hospital, several medical clinics, home health care, and two nursing homes. Two school districts and one community college with several outlying learning centers provide educational opportunities. Numerous parks and ball fields, which provide youth and adult sporting activities, can be found within or nearby the cities and towns. The cities of Rock Springs and Green River have recreational and community centers. Flaming Gorge National Recreation Area lies south and between the cities of Green River and Rock Springs. Other outdoor recreation opportunities are available including SeedsKadee National Wildlife Refuge, historic trails, hunting, fishing, boating, hiking, backpacking, 4-wheeling, mountain biking, sight-seeing, etc.

Cultural attractions occur throughout the year including Flaming Gorge Days, Red Desert Rodeo, stock car races, festivals celebrating international cultures, and a balloon extravaganza, among others. There are several museums and



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McKinnon/Burntfork with 84 persons. Approximately 5,700 persons lived outside population centers (SWEDA 1998b).

The estimated ethnic make up of Sweetwater County in 1996 includes 35,776 whites, 3,573 whites of Hispanic origin, 3,658 Hispanics, 316 African-Americans, 323 American Indian (category also includes Eskimo and Aleutian), 334 Asian or Pacific Islander (State of Wyoming 1998a). Others with ethnic backgrounds different than those mentioned above also live in Sweetwater County.

### Fremont County

Population in Fremont County in July 1997 is estimated between 35,888 (WSDC Bulletin 1998) and 36,200 (Wyoming Almanac). Again, the population took a dip in the late 1980s and early 1990s. In 1987, 34,844 individuals lived in Fremont County. By 1990, the population dipped to approximately 33,662. Since 1990, the population has increased to somewhere between 35,888 and 36,200 (1997 estimate). In the last decade, population has increased by approximately 1,356 individuals. Table 3-12 shows Fremont County population estimates in the last decade and estimates for the early millennium.

The main population centers in Fremont County include Riverton with 10,050 members and Lander with 7,372 members. Other population centers include the communities of Dubois, Shoshoni, Hudson, and Pavillion with population of 1,018, 522, 411, and 135, respectively (1996 estimates, State of Wyoming 1998a). Approximately 16,500 individuals live outside the major population centers.

The estimated ethnic make up of Fremont County in 1996 includes 28,012 whites, 944 whites of Hispanic origin, 1,384 Hispanics, 62 African-Americans, 6,792 American Indian (category also includes Eskimo and Aleutian), 130 Asian or Pacific Islander (State of Wyoming 1998a). Others with ethnic backgrounds different than those mentioned above may also live in Fremont County.

### Sublette County

Population in Sublette County in July 1997 is estimated between 5,640 (State of Wyoming 1998a) and 5,696 (WSDC Bulletin 1998). In 1987, 5,358 individuals lived in Sublette County. By 1990, the population dipped to approximately 4,843. Since 1990, the population has increased to 5,696 (1997 estimate). Overall, the population has increased by 853 individuals in the last 10 years. Table 3-13 shows Sublette County population estimates in the last decade and estimates for the early millennium.

The main population centers in Sublette County include Pinedale with 1,274 members, Marbleton with 689 members, and Big Piney with 478 members (1996 estimates, State of Wyoming 1998a). Almost 60 percent (3,136 individuals) of the population live outside of incorporated population centers.

The estimated ethnic make up of Sublette County in 1996 includes 5,406 whites, 68 whites of Hispanic origin, 68 Hispanics, 5 African-Americans, 81 American Indian (cat-

egory also includes Eskimo and Aleutian), 17 Asian or Pacific Islander (State of Wyoming 1998a). Others with ethnic backgrounds different than those mentioned above may also live in Sublette County.

## Housing

### Sweetwater County

In 1970, Sweetwater County's population was just under 18,400 people and by 1982, the population bloomed to almost 46,000 residents. Today (1997 estimate), the population stands at over 40,000. The cycle of growth and decline is reflected by changes in housing availability. Through the 1970s and early 1980s, much of the demand for housing was accommodated by mobile homes. When employment opportunities declined, many mobile home residents left the community or moved into site built homes. In addition, some company owned apartments in the area were removed.

Due to increased employment opportunities in the early 1990s, some 430 new single family and multi-family housing units were added between 1990 and 1993. By late 1997, approximately 16,400 housing units existed including 10,415 single family homes, 1,809 multi-family units (duplexes and apartments), and approximately 4,169 mobile homes (Sweetwater County 1998).

In Sweetwater County there were fewer vacancies for all types of housing in 1994 than in 1990. Rental rates have continued to climb since 1990 with average in December 1997 of \$366 for a two bedroom apartment and \$460 for a two bedroom house in Sweetwater County (Sweetwater County 1998). As of early June 1998, there were 355 housing units for sale (Vanderpool 1998) and 80 units for rent (Rocket Miner 1998).

As of 1998, the price of a new 1,200 square foot home in Sweetwater County was almost \$130,000 (Sweetwater 1998). Existing average homes for sale cost around \$110,000-120,000 (Robertson 1998). Housing starts in the first five months of 1998 numbered 25. By the year 2000, it is estimated that an additional 700 housing units will be required in Sweetwater County should current economic indicators hold true (Sweetwater County 1998). In 1997, Sweetwater County issued 75 building permits (State of Wyoming 1998b).

### Fremont County

Housing situation in Fremont County is based upon review of a local newspaper, Lander Wyoming State Journal on June 7 and 24, 1998, and July 5, 1998.

Housing in Fremont County is available. Approximately 12-18 houses, in every price range (\$40,000 to \$400,000+), were for sale in June/July 1998. More moderately price homes sell faster than higher priced homes (Barlett 1998). Summer or second homes are fairly common in Fremont County. Fremont county issued 54 building permits in 1997 (State of Wyoming 1998b). Rentals are very readily available including apartments, mobile homes, some site-constructed houses, and even rooms. Average rental rate in Riverton was \$347 for







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A portion of the total economic activity associated with the planning area represented labor earnings (wage and salary payments and self-employment income) in the region. Table 3-29 indicates that total earnings (direct and secondary) in the region from economic activities in the planning area amounted to \$1.7 million in 1998.

Oil and gas activity (development and production) represented 64 percent of the total earnings for the planning area. Nonresident non-consumptive recreation expenditures represented 25 percent of the total earnings. The rest represented earnings from livestock grazing (9 percent) and nonresident hunting expenditures (2 percent). The percentage of earnings from oil and gas activity was somewhat lower than that for the direct and total impacts because oil and gas activity was less labor intensive than other economic activities in the planning area. Similarly, the percentage of earnings from nonresident non-consumptive recreation expenditures was somewhat higher because the sectors associated with this economic activity were more labor intensive. Differences in the relative wage rates between economic activities also affected the percentage of earnings for different economic activities.

The economic activity associated with the planning area also supports employment in the Southwest Wyoming economy. Table 3-30 summarizes the total employment (direct and secondary) supported by the economic activity in the planning area. The employment estimates were expressed on annual job equivalents basis. An annual job equivalent represents 12 months of employment. For example, one annual job equivalent could represent one job for 12 months or two jobs for six months or three jobs for four months. The total employment resulting from the economic activity in the planning area was estimated to have been the equivalent of nearly 80 annual jobs in 1998.

Nonresident non-consumptive recreation expenditures and oil and gas activity represented about 43 percent and 42 percent, respectively, of the total employment associated with the planning area. The rest came from livestock grazing (12 percent) and nonresident hunting expenditures (4 percent). The percentage of employment from oil and gas activity was lower than that for the direct and total impacts because oil and gas activity was less labor intensive than other economic activities in the Jack Morrow Hills. Similarly the percentage of employment from nonresident non-consumptive recreation expenditures was higher because the sectors associated with this economic activity were more labor intensive.

By comparing labor earnings and employment it is possible to get an estimate of the average earnings per job for the economic activities in the planning area. Table 3-31 summarizes the average earnings per job for the various economic activities found in the area. Average earnings per job for all economic activities in the planning area were \$21,391. This was about 80 percent of the average earnings for all jobs in Southwest Wyoming (\$27,122). There was substantial variation in average earning per job between different economic activities in the planning area. They ranged from a low of \$12,521 per job for nonresident non-consumptive recreation expenditures to a high of \$32,369 per job for oil and gas activities. Average earnings per job were over 2.5 times

greater for oil and gas activities than for nonresident non-consumptive recreation expenditures. Average earnings per job for livestock grazing were only about one-half of those for oil and gas activity, but were about 30 percent higher than for nonresident non-consumptive recreation expenditures. Average earnings per job for nonresident hunting expenditures were about 14 percent higher than for nonresident non-consumptive recreation expenditures. The earnings per job estimates represent the average for all jobs directly or indirectly associated with the activity, not just the direct jobs in the producing sectors.

Economic activities on federal land, such as the planning area, are an important source of revenue for local governments in Southwest Wyoming. Table 3-32 summarizes the revenues to local governments in the region that result from the economic activities in the planning area. The estimated total local government revenue in Southwest Wyoming from economic activity in the planning area was about \$512,000 in 1998.

Due to the tax structure in Wyoming, oil and gas activity (development and production) was the largest source of local government revenue from the Jack Morrow Hills representing 86 percent of the total. The second largest source was nonresident non-consumptive recreation expenditures (8 percent). The rest of the revenue came from livestock grazing (5 percent) and nonresident hunter expenditures (1 percent).

Recreation activities in the planning area were important to Southwest Wyoming not only because they attract nonresident visitor expenditures but also because they provide recreation opportunities for regional residents. As such, they are part of the quality of life associated with living in Southwest Wyoming. Table 3-33 summarizes the estimated net economic benefits to resident users from participating in recreation activities in the planning area. The total net economic benefit from resident recreation use in the planning area was estimated to be about \$593,000 in 1998. Resident non-consumptive recreation use represented 75 percent of the total with the other 25 percent from resident hunting.

## SOILS

Soils in this area are generally light colored with minimal leaching of soluble salts. Uplands are dominated by soils with fractured sandstone and shale bedrock within 40 inches of the surface. Many of these soils also have flat rock fragments throughout the profile. Rock outcrop is common. The high calcium carbonate content and steeper slopes of these upland soils makes many of them susceptible to water erosion. Drainages and lower slopes have deeper soils with less rock and more vegetation. Red soils, which are often highly erosive, occur in some drainages. Darker soils with greater leaching and development and consequent productivity occur in the northeast corner of the planning area at higher elevations. These darker soils also occur in snow drift areas around Steamboat and Essex Mountains. The Killpecker Dune field, composed of active and stabilized sand dunes, traverses the southern perimeter of this area. The vegetated dunes are susceptible to severe wind erosion when the stabilizing plant cover is removed.



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Mandatory surveys and avoidance of this species would prevent adverse effects in the planning area. Consultation procedures with the U.S. Fish and Wildlife Service as mandated under Section 7 of the Endangered Species Act would be required for any project that would involve potential or known habitat areas for the Ute ladies'-tresses.

In addition, range condition assessments conducted under the Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management on BLM lands would address this species.

### Small Rockcress (*Arabis pusilla*)

Small rockcress was formerly proposed for listing under the Endangered Species Act as either Threatened or Endangered. It has been dropped from consideration due to the protection currently afforded the species but may be proposed again in the future if any threats are identified. The Nature Conservancy ranks this plant as G1S1, extremely vulnerable to extinction globally and extremely vulnerable to extirpation statewide. Small rockcress is known from only one location in the southern Wind River Range in Fremont County, Wyoming. The single known population occurs on about 6 acres of suitable habitat just north of the planning area boundary, on public land managed by the BLM.

Small rockcress is found in crevices and on sparsely vegetated, very coarse soil in granite-pegmatite outcrops surrounded by sagebrush grassland. Most granite-pegmatite outcrops in the South Pass area were surveyed in 1986 by the Nature Conservancy-Wyoming Natural Diversity Database (Mariott 1988). Other suitable habitats along the Lander Cutoff were spot-checked. No other populations were located during that survey. More plants were found in the immediate area during a later survey conducted for the U.S. Fish and Wildlife Service (Dorn 1990). The entire population size is estimated at 600 individuals. Motorized recreational activity and livestock grazing in the area have been identified as threats to the population. The extremely restricted geographic range of this species makes it highly vulnerable to extinction.

A Habitat Management Plan/Environmental Assessment was developed for the protection of the small rockcress and its habitat in 1994. Protective management actions that have been implemented include designation of the species' habitat and surrounding area part of the Special Status Plant Area of Critical Environmental Concern (ACEC); construction of a 500-acre enclosure around the plants and their habitat; closure and rehabilitation of two-track trails through the ACEC, annual monitoring of the plant populations, closure within the ACEC to motorized vehicles, surface disturbing activities and livestock grazing; a No Surface Occupancy designation for mineral leasing; and institution of a permanent mineral withdrawal (signed February 4, 1998). This species is also included in the Special Status Plant Area of Critical Environmental Concern (ACEC) which closes the habitat to surface disturbing activities.

Although it is not likely that this species occurs within the planning area due to limited habitat, granitic outcrops along the Sweetwater River may provide suitable habitat. Searches

for the small rockcress would be required in suitable habitat prior to any surface disturbing activities by authorization of the Green River RMP/Record of Decision (USDI 1997) and the BLM Manual Section 6840.

### Blowout penstemon (*Penstemon haydenii*)

Blowout penstemon is listed as an Endangered species by the U.S. Fish and Wildlife Service under the Endangered Species Act. This species, a member of the figwort family, occurs in two general areas of the interior western United States: in the Sand Hills of central Nebraska and a recently discovered location in the sand dune country south of the Ferris Mountains in south-central Wyoming. The total population consists of thirteen populations in Nebraska containing 3,000 - 5,000 individuals (Stubbendick, et al., 1997) and approximately 300 to 500 plants in one location of less than 20 acres in Wyoming. Threats to the species include off-road vehicle traffic, removal of fire, and leveling of the sand dunes.

Blowout penstemon is a perennial herb reaching 1 foot tall with one to many stems. It has milky-blue to pale lavender flowers that are 1 inch long and found in 6 to 10 whorls. It is found in sparsely vegetated, actively shifting sand dunes and blow-out depressions. It is commonly found with thickspike wheatgrass, lemon scurf-pea, and rubber rabbitbrush. It flowers from late June to early July.

## Other Special Status Plant Species

General floristic inventories were conducted in the planning area by botanists from the University of Wyoming Rocky Mountain Herbarium and the Wyoming Natural Diversity Database (WNDDDB) between 1994 and 1996. Species specific status surveys were performed for *Lesquerella macrocarpa* (1994) and *Antennaria arcuata* (1994); permanent transects have been established and baseline information gathered for these species. In addition, the 1995 WNDDDB vegetation inventory provided information on 10 species of special concern found within the planning area.

### Meadow Pussytoes (*Antennaria arcuata*)

Meadow pussytoes is a former Category 2 Candidate. The Nature Conservancy ranks this plant as G2S2, very vulnerable to extinction globally and very vulnerable to extirpation statewide, due to its restricted range. *Antennaria arcuata* has been found in Idaho (one site in Blaine County near Carey) and Nevada (two sites in Elko County). Twenty sites are known from Wyoming, all in Fremont County. Most known locations are east and southeast of Atlantic City, while two occurrences are in the Granite Mountains northwest of Jeffrey City. Two populations are found on public land southwest of South Pass City. One population is found along Fish Creek approximately 1 mile west of Wyoming Highway 28; the other is located about 1.5 miles east of Wyoming Highway 28 on Pine Creek. Populations of meadow pussytoes at these sites are small compared to those near Atlantic City and in the Granite Mountains. Only one of the twenty Wyoming populations was previously known to extend into the Rock Springs Field Office at Long Slough, near South Pass City. However,











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Petroglyphs, Steamboat Mountain, rivers, historic trails, and scenic vistas along Wyoming Highway 28. Current VRM classifications are described in Table 2-8.

### WATERSHED

The planning area eventually drains into the Colorado River except for the small portion of the planning area that is on the eastern side of the Continental Divide. Most of the planning area is within the Colorado River drainage and subject to the Colorado River Salinity Compact.

### Rainfall

The average annual rainfall in the planning area ranges from 8 inches near Farson to 14 inches in the higher elevations. This precipitation comes primarily in the form of winter snow and scattered summer thunder storms. Because of this there is a seasonal runoff with peak flows in the spring and occasional summer runoff that tends to be intense and sporadic.

### Channel Condition

Stream channels in the higher elevations are characterized by long meadows bracketed by rock outcrops. In the lower reaches, stream channels tend to form broad floodplains of fine sediment that rely on vegetation for channel stability.

At the end of the 1999 field season, 79.95 miles of streams on public land in the planning area have been surveyed in the planning area using the Proper Functioning Condition survey method as described in BLM Technical Reference 1737-9. The results are shown in Table 3-35.

Because PFC is the minimum physical desired stability rating, this indicates that 20.6 percent of the observed streams are sufficiently stable to withstand moderate flows. Most of this stability can be attributed to rocky substrates. Forty percent of the observed streams have limited stability and are showing some improvement, and 40 percent of the streams have limited stability and are showing signs of becoming more unstable. This high percentage of instability results in a greater than natural loss of soil and elevated levels of sediment, and salinity over what would occur in a stable stream system.

### Water Quality

There are no known point sources of water pollution in the planning area. This means that water quality is controlled by Nonpoint sources such as area wide soil erosion and stream channel condition.

Water quality samples have been taken in the planning area in a random pattern over the last 20 years. The lack of point sources in the drainage area allows overall water quality to be assessed using the level of Total Dissolved Solids (TDS) as a general guide. TDS can be thought of as a measurement of how much salt is dissolved in a given volume of water.

The State of Wyoming Department of Environmental Quality (DEQ) has set guidelines for TDS levels and acceptable uses of ground water (Table 3-36). These levels can be applied as general guidelines for surface water use.

Pacific Creek, its tributary Jack Morrow Creek, and Killpecker Creek are tributaries to the Green River and Colorado River systems and are subject to the Colorado River Salinity Compact (Map 55). The Sweetwater River is a tributary to the North Platte River. According to water samples taken over the last 20 years, the water quality in the streams from the Colorado River Drainage tends to be suitable for livestock water and in some but not all places is within the range for agricultural water (Table 3-37).

Given the PFC ratings and the water quality numbers, there is room for improvement in the planning area. The stream system is sensitive to disturbance but has a good chance of recovery and increased stability if it is managed for these attributes (see Table 3-38).

As of 1999 there are no streams within the planning area that are on the Wyoming State 303d list. The closest stream that is currently on the 303d list is the Big Sandy River. The TMDL process for the Big Sandy River is well under way. If streams within the planning area are listed in the future, land use management will be adjusted to comply with the TMDL process.

### WILD HORSES

The Great Divide Basin Wild Horse Herd Management Area is located 40 miles east of Rock Springs in the eastern portion of the planning area north of Interstate 80. It encompasses an area from the Rawlins-Rock Springs Field Office boundary west to the Continental Divide. The management level range is 415 to 600 wild horses. The area consists of 778,915 acres of which 73 percent is public, 2 percent is state, and 25 percent is private. The portion of the herd management area that lies within the planning area is predominantly public land. Wild horse management within the Great Divide Basin Wild Horse Herd Management Area is in accordance with the herd area management plan.

Approximately 206,540 acres of the Great Divide Basin Wild Horse Herd Management Area lie within the planning area. This area encompasses roughly the eastern one-third of the planning area with the western boundary of the herd management area formed by the western branch of the Continental Divide. This boundary is unfenced and does not provide an effective barrier to the movement of wild horses. Wild horses are often found outside the herd management area yet within the planning area. These horses are by definition "excess" and are subject to annual removal. These horses are largely confined to the Steamboat Mountain ACEC and the Rock Cabin Creek/Oregon Buttes areas.

Dispersed outdoor recreation activities related to the viewing and enjoyment of free-roaming wild horses in the planning area is becoming more prevalent. Opportunities exist and may be improved to assist the public in viewing wild horses in their natural habitat.



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are in association with greasewood, spiny hopsage, or shadscale. These plants apparently provide basic carbohydrates, protein, and other nutrients for growth and body maintenance of pronghorn.

Probably the single most important factor affecting antelope populations is weather. Severe winters with deep, crusted snow and below zero temperatures cause high antelope mortalities. An example of weather-induced population dynamics is the drastic reduction of antelope numbers in the planning area due to severe winter storms in the early 1970s. Mortality loss in the Red Desert herd unit in 1971-72 was estimated at 55 percent.

The water requirements of antelope are met through foraging on plants, consumption of snow, and natural surface water. The availability and distribution of water is probably the most important limiting factor affecting summer antelope distribution.

Lack of surface water in some areas influences migration of pronghorn and their season of use on particular ranges. In many areas, pronghorn rely on plant moisture, rains, some perennial seeps, and human-made water developments to make summer use of otherwise unsuitable habitat. Mild winters during 1987, 1988, 1989, and 1990 reduced winter mortality; however, drought conditions have caused significant losses of fawns in some areas. Water developments have helped improve antelope distribution in some local situations, but timely rainfall and availability of natural water are more significant in maintaining a sustained yield of wildlife. Disease and predation have not been documented as significantly affecting local big game populations.

Fences affect pronghorn movement in the planning area. Right-of-way fences along Wyoming Highway 28 have especially affected movement of antelope into the planning area. Woven wire fences form a barrier to antelope movement. Fence modifications such as antelope passes and lay-down panels, when well maintained, have helped pronghorn cope with some fences.

In 1975, the Wyoming Highway Department began a fencing program on southwest Wyoming highways which continues today. Dimensions, design, and placement of these and other new fences are causing some migration problems and some direct and indirect mortality on big game animals, especially the young. The placement of either wooden or wire stays between posts creates a very tight fence and prevents wildlife from migrating through fences they cannot jump.

### Rocky Mountain Elk

The entire planning area is part of the Steamboat herd unit for elk. The herd unit is over 2,600,000 acres with approximately 574,800 acres of public land occurring within the planning area (Map 59). The population objective for this herd is 500 with the actual population being approximately 600 animals (WGFD 2000). Approximately 172,740 acres of public lands are classified as crucial winter range and 58,890

acres of public land are classified as elk calving areas. These acres amount to 67 percent of all classified winter range and 86 percent of parturition habitats for the entire herd unit occurring within the planning area. This demonstrates the importance of the planning area to elk as well as other big game species.

Elk historically migrated to the planning area from Jackson and Yellowstone. Records indicate that this movement was so large that portions of the area were proposed as a winter elk refuge. The last major movement occurred in 1913. Agricultural developments and hunter shooting lines either blocked this movement or the elk decided to stay on newly developed hay fields. Historic information shows a remnant population of elk lived within the planning area until around 1940. Transplants to re-establish elk began in 1944 and continued until around 1967. Some 438 elk were released at various locations within the planning and herd area. Elk numbers continued to increase and reached between 1,200 and 1,400 animals by 1977. By 1981, elk numbers had decreased to approximately 290 animals. Some of the Steamboat elk migrate south to North and South Table Mountain and winter from Hatcher Mesa to Long Canyon and Pine Canyon. This migration has not been observed since about 1985, primarily due to the large amount of human disturbance and activities associated with oil and gas development and year-round access into much of the area for recreationists and other public land users (Map 60).

Elk forage on a wide variety of trees and shrubs, grasses, and herbaceous plants. Fecal studies conducted from 1974 through 1978 show that 74 percent of the diet was grass, 3.5 percent of the diet was forbs, and 22.5 percent consisted of shrubs. More than half of the browse was antelope bitterbrush.

Elk historically were a plains animal; this is one of the few desert elk herds left in the United States. Elk are very intolerant of human presence and are known to travel large distances (up to 3 miles) when disturbed within the planning area (Bock and Lindzey 1999). Lack of hiding cover in this desert environment requires elk to use topographic barriers to escape intrusion. Increased activity within the planning area will displace elk to areas that offer these type barriers.

### Moose

Moose found in the planning area are part of the Lander herd unit. Habitat is very limited and these animals are generally migrants although moose are not rare in the planning area. Approximately 55,660 acres of the Lander herd unit occur in the planning area.

### Bighorn Sheep

No bighorn sheep are known to inhabit the planning area. Petroglyphs found in the vicinity of the planning area show bighorns which means they were probably historically found in the planning area. Also, many written accounts of bighorn sheep were recorded in the years 1805 to 1878 (Dorn 1986).



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place all night during full moon periods. An estimated 15 to 20 percent of the actual strutting grounds have been identified.

Historic and long-term information on sage grouse nesting indicates that 80 to 85 percent of nesting occurs within a 2-mile radius of strutting grounds. Recent radiotelemetry data gathered by Rocky Mountain Energy biologists show that some grouse move up to 11 miles to nest, while most range one to four miles. University of Wyoming Co-op studies have consistently shown the most successful nests are located beyond 2 miles (Anderson 1999).

### Raptors

There are 83 raptor nests identified in the planning area and approximately 43,150 acres of nesting habitat (Map 62). There are 27 different species of hawks, eagles, and owls either nesting, thought to nest, or having the potential of nesting in the planning area. Other species are either wintering populations, migrants, or possible migrants. The bald eagle is federally listed as a Threatened species and requires a biological assessment for activities which may jeopardize or destroy it or its critical habitats. The BLM has identified the bald eagle, peregrine falcon, ferruginous hawk, prairie falcon, osprey, and golden eagle, as raptors of high priority and has effected conservation and habitat criteria for management. The burrowing owl is listed by the state as a species in the "rare" abundance category with a biological status designation of "I," indicating declining populations and/or habitat conditions or indicators of such throughout all or a part of their range.

Approximately 70 percent of the planning area has been surveyed for nesting raptors. About 40 percent of the planning area was surveyed for "special habitat features" in 1979 with most potential cliff-nesting habitat identified. A 1980-1981 raptor inventory was conducted within the Rock Springs Known Recoverable Coal Resource Area by BLM biologists and survey crews to satisfy coal leasing suitability criterion. Raptor inventories have not been completed on all potential habitats in the planning area. Raptor studies are currently driven by specific development projects and data are collected to determine raptor management conflicts.

Many of the known raptor nests occur on hilltops, low cliffs, and rock escarpments found within the sagebrush steppe community. Conservation and management of this habitat component is of primary importance.

Raptor species that are commonly seen in the planning area include prairie falcon, American kestrel, ferruginous hawk, red-tailed hawk, Swainson's hawk, northern harrier, raven, golden eagle, and great-horned owl.

Prairie falcons nest on cliffs, ranging from low rock outcroppings to tall vertical cliffs (e.g., Rock Springs Uplift, Steamboat Mountain). Prairie falcon feed on cottontail rabbits, prairie dogs, horned larks, snakes, and ground squirrels.

American kestrels nest in varied environments such as dead snags, clay streambanks, and rimrock. Their diet includes insects, small birds, and small mammals.

Swainson's hawks nest on dry plains, open foothills, open forest, sparse trees, and riverbottoms (e.g., the Green River, Little Sandy River, and wood lots). Their diet includes rabbits, other small mammals, grasshoppers, and birds.

The ferruginous hawks nest on low cliffs, buttes, trees, on the ground, and artificial nesting platforms. Their diet consists primarily of rodents. These hawks have also been known to nest on sheepherder monuments found throughout the planning area. Current population estimates show these hawks are declining in numbers within the planning area.

The red-tailed hawk prefers riparian zones and timbered areas for nesting. Their diet includes cottontails, jackrabbits, rodents, reptiles, and birds.

The northern harrier (or marsh hawk) commonly nests on the ground, often in dense vegetation. Their diet consists primarily of rodents, amphibians, reptiles, and other birds.

Golden eagles nest on cliffs, ledges, and pinnacles that provide a view of the area. Their diet includes rabbits, rodents, and carrion.

Great-horned owls nest in cliff holes, rock crevices, and trees. Their diet includes a wide variety of small mammals.

### Aquatic

Aquatic wildlife in the planning area is primarily found in the streams which cross through the area. The most important ponds or lentic habitats are found in the sand dunes region (locally called the "flockets").

The streams containing fish life are the Sweetwater River, Harris Slough, Oregon Slough, Pacific Creek, and Jack Morrow Creek (Table 3-39). Cold water game fish exist in some portions of all of these except Jack Morrow Creek which only contains non-game minnow species.

The Sweetwater River has the highest WGFD rating of all the streams within the Jack Morrow planning area with a classification of 3 (Important trout waters - fisheries of regional importance). Pacific Creek, Harris Slough, and Oregon Slough all have classifications of 4 (Low production trout waters - fisheries frequently of local importance, but generally incapable of sustaining substantial fishing pressure). All the rest of the streams in the area (perennial and intermittent) are classified as 5 (very low production waters).

The Sweetwater River represents the highest value cold water fishery in the planning area with an estimated 630 to 2,350 trout per mile. Pacific Creek trout populations range from 0 to 1,500 trout per mile (page 2-101, Sandy Grazing EA). Water quality within this area is generally suitable for most other aquatic organisms (see hydrology section). No threatened or endangered aquatic species have been identified in this area. However, water flowing into the Green River Drainage is considered a direct contributor to the habitat for four endangered fish species in the upper Colorado River. Any withdrawals of water from these tributaries are considered to adversely affect these species and require Section 7 consultation (Endangered Species Act) with the U.S. Fish and



## AFFECTED ENVIRONMENT

### Current Status and Habitat Use by Threatened and Endangered Species

Four federally listed endangered species may have inhabited the planning area. Listed species include black-footed ferret, bald eagle, whooping crane, Colorado River fish species, blowout penstemon, and Ute ladies'-tresses.

#### Black-Footed Ferret (*Mustela nigripes*)

There is historical documentation of presence of ferrets near the planning area as late as 1984. Other areas where ferrets are presumed to have occurred near the planning area are Sublette Flats, Seedskadee National Wildlife Refuge, and the Red Desert. Potential areas of ferret habitat can be delineated due to their association with prairie dogs and prairie dog colonies. Researchers have concluded that the

black-footed ferret has never been very abundant based upon archaeological and historical evidence.

Primarily nocturnal, ferrets spend much of their time below ground and are rarely seen during daylight hours. This behavior is probably the reason for so few sightings recorded here and elsewhere.

Few formal surveys and inventories of prairie dogs have been conducted in the planning area. Numerous scattered white-tailed prairie dog colonies occur south of Tule Butte near Fifteen Mile flowing well, north of Essex Mountain, in the Oregon Buttes-Continental peak area and in the Red Desert. Known colonies have been plotted on map mylar for placement in the BLM GIS database.

The following black-footed ferret sightings were near the planning area boundary.

| Date        | Location  | Animal(s)       | Comments  |
|-------------|---|-----------------|-----------|
| Spring 1969 | Sweetwater County, 2 miles west of Eden           | 1 adult, 4 kits | Confirmed |
| Summer 1979 | Sweetwater Co., Superior Exit on I-80             | 1 adult(?)      | Probable  |
| May 1983    | T. 23 N., R. 98 W., Sweetwater Co.                | 1 adult         | Confirmed |
| July 1983   | Sweetwater Co., Bar-X Road near I-80              | 1 adult(?)      | Probable  |
| June 1984   | T. 26 N., R. 105 W., Sec 36 on S. side of Hwy 28. | 1 adult(?)      | Probable  |

**Management Conflicts** Animal damage control programs probably have had the greatest impact on ferret mortality. From the 1920s until the mid-1970s, predator control through trapping and poisoning resulted in some black-footed ferret mortality. Secondary poisoning of ferrets is also known to have occurred from highly toxic rodenticides used in prairie dog eradication programs.

Coyote trapping and sport prairie dog hunting activities have resulted in some ferret mortality in the past. These activities need some measure of control and agencies need to initiate efforts to educate hunters and trappers about ferret identification and their habits.

Land use activities such as rights-of-ways, energy developments, Special Land Use and Free Use permits, urban expansion, mineral extraction, and grazing programs can effect the quality and quantity of ferret habitat and therefore require inventory and clearances. Habitat losses can be minimized through analysis, planning, and coordination.

#### Bald Eagle (*Haliaeetus leucocephalus*)

The main food item for this species is fish. Bald eagles nest in association with water, and most often winter where fish are available. Additional food items may include ducks, coots, rabbits, carrion, and small rodents.

The accelerated decline in numbers of the species since World War II has been attributed to several factors. The bald eagle and other raptors have suffered reproductive problems

due to organochloride pesticide poisoning. Raptors are especially susceptible to accidental poisoning through animal damage control programs, primarily when administered by untrained or unauthorized individuals.

Shooting is another significant factor, causing fledgling mortality estimated as high as 75 percent in some areas. Electrocution, while still a problem, has been reduced through alteration and redesign of many power transmission systems both nationally and locally.

**Habitat Requirements** Bald eagles are found primarily along rivers and inland lakes where their nests are usually located in large coniferous or deciduous trees. Streams and rivers with trees, especially conifers, are uncommon to nonexistent in the planning area. Currently, the only known active bald eagle nesting site near the planning area is on the Green River on Seedskadee National Wildlife Refuge.

In the planning area, the bald eagle is classed as a casual migrant. They have been observed feeding on carrion near Pacific Butte and perched on signposts along the AT&T pipeline during winter. The bald eagle is fully protected by the Endangered Species Act of 1973 (Federal Register 1978), the Bald and Golden Eagle Act, the Migratory Bird Treaties, and Wyoming Game and Fish Department laws.

**Management Conflicts** The primary factor influencing the bald eagle's habitation of the area is available undisturbed habitat and the absence of significant river systems with large woody vegetation.



## AFFECTED ENVIRONMENT

### Mountain Plover (*Charadrius montanus*)

**Population Distribution** The mountain plover is a candidate species (proposed threatened) inhabiting the high dry short-grass plains/prairies east of the Rocky Mountains, as well as the sagebrush grasslands throughout Wyoming. It is also known from northern Utah and northwestern Colorado. The focus of breeding activity appears to be northeastern Colorado.

Taxonomic changes recently placed this bird with other plovers and killdeer. The bird is of bland coloration about the size of a killdeer without the striking white marking on the head and breast rings. The bird summers and nests in areas of naturally occurring low vegetation within the planning area.

**Habitat Requirements** Parrish, et al. (1993) noted that mountain plover nests in northeastern Wyoming were found in areas of short (< 4 inches) vegetation on slopes of less than 3 percent. Any short grass, short shrub, or cushion plant communities could be considered as nesting habitat. In Colorado, the mountain plover diet is composed of 99.7 percent arthropods, with beetles, grasshoppers, crickets, and ants the most important food items (Baldwin 1971). Breeding bird surveys between 1966 and 1987 show an overall decline in the continental population of mountain plovers (U.S. Department of Agriculture, Forest Service, 1994a). Surveys completed in 1991 indicate that only 4,360 to 5,610 mountain plovers remain on the North American continent.

**Conflicts** Probably the most important reasons for the decline of the mountain plover are human impacts and habitat alteration on breeding grounds and the degradation in the quality of wintering habitats. Loss of breeding habitat due to cultivation and prey base declines resulting from pesticide use are also threats to mountain plover survival. Cattle often maintain the open blue grama/buffalo grass preferred by mountain plovers so livestock grazing may benefit the species to some extent. However livestock grazing can also result in a reduction in prey species for mountain plovers due to the reduction in vegetation. Surveys would help determine breeding and nesting areas. Activities would avoid nesting and breeding areas during these periods.

### Candidate Species

#### Swift Fox (*Vulpes velox*)

**Population Distribution** The swift fox, a federal candidate species, is a resident of the Great Plains from the northern Rocky Mountain foothills in southern Canada to western Texas. In Wyoming, this species primarily inhabits the eastern Great Plains grasslands of the state. A few sightings have been reported in the Rock Springs Field Office area.

**Habitat Requirements** Living up to its name, the swift fox can reach speeds of over 50 km/hr. This speed allows it to catch its prey and also to escape predators such as coyotes, golden eagles, bobcats, and wolves. Swift fox dens are burrows located in sandy soil on open, bald prairie, along fence rows or in plowed fields and often in association with prairie dog towns. The diet of swift fox varies seasonally. Hunting primarily at night, they feed on a variety of food including: small mammals, birds, reptiles, amphibians, and insects.

**Conflicts** Historically, the major threat to the swift fox has been extermination by humans. Trapping, shooting, and poisoning as part of predator control programs for coyotes and red fox caused the extinction of the Canadian population of this species. While it is now illegal to kill swift foxes, some are still confused with coyotes and red fox and are killed by mistake.

Current threats to the swift fox include habitat loss, automobile traffic, accidental killings, and conversion of grasslands to agricultural lands.

### Special Status Species

#### Small Rockcress (*Arabis pusilla*)

See the discussion at Special Status Plant Species in this chapter.

#### Wolverine (*Gulo gulo*)

No sightings of wolverine or their scat or tracks have been made in or adjacent to the planning area in over 20 years. They are not expected to inhabit the planning area in the long term. The Oregon Buttes provide the only habitat suitable for this species in the planning area.

**Management Conflicts** Animal damage control activities and encroachment on undisturbed forested lands are the primary conflicts with this species.

#### Pygmy rabbit (*Brachylagus idahoensis*)

The Wyoming population of this small rabbit was first described by Tom Campbell of Biota Research in a paper of 1980. It was thought to occur primarily within sandy hummock habitats south and west of Little America. The Nature Conservancy has continued inventory of this species in the Field Office area during recent years and conclude the population is interspersed within desert cottontail (*S. auduboni*) populations. Pygmy rabbits are found over a broader area than first thought, now extending into the Red Desert and south into South Baxter Basin. With dramatic cyclic trends in rabbit species, the long-term effect of mineral development, road development, and other factors of habitat loss cannot be realistically assessed. Hunting is not considered to be a factor in long-term population alteration. Some discussion of management direction toward commodity development discussed in the Preferred Alternative may adversely impact habitat for this species.

#### Peregrine Falcon (*Falco peregrinus*)

The peregrine falcon was removed from the endangered species list in August 1999. The BLM will continue its current management practices until the U.S. Fish and Wildlife Service releases its management plan for the peregrine falcon.

The apparent reason for the precipitous decline of the species in the United States, beginning in 1947, was the loss in reproduction due to sublethal chronic poisoning from organic chlorine pesticides. This poisoning is manifested in the thinning of egg shells which results in accidental breakage.



## AFFECTED ENVIRONMENT

Sweetwater County, they are most commonly seen during spring migration and casual during late summer.

**Management Conflicts** Wetland and riparian habitat loss and degradation may be associated with the decline of long-billed curlew in the planning area. Destruction or alteration of prairie dog towns may also be associated with the decline of the long-billed curlew.

### **White-faced ibis (*Plegadis chihi*)**

These birds are commonly seen in the planning area spring through fall. A large nesting colony had used the Old Eden Reservoir slough annually until drought in 1986. Loss of this water source and loss of suitable habitat at Old Eden Reservoir slough since then, has resulted in no known nesting by the species at this location. The prolonged drought may result in losing birds aware of this nesting site and will require recolonization by pioneering birds. Sightings of white-faced ibis were common in wetland habitats of the Sand Dunes and along perennial streams in the planning area prior to this long-term drought. Sightings of white-faced ibis are still common in the Farson/Eden area during the migration.

**Management Conflicts** Wetland and riparian activities causing degradation or habitat loss are in direct conflict with management of this species. Maintaining some residual cover along streams and standing waters is necessary for nesting. Fox and raccoons are somewhat predatory on nesting ibis. Management should be directed at improving residual nesting and escape cover, maintaining healthy riparian habitats and helping maintain flooded areas for nesting.

### **Flannelmouth sucker (*Catostomus latipinnis*)**

The species selects river runs, shorelines, eddies, and pools of main river systems. During the 1970s and early 1980s, they migrated up the Green River from Flaming Gorge Reservoir in large numbers to spawn in the Big Sandy River, Slate Creek, and even into Alkali Creek. Spawning fish were usually 12 to 16 inches in length and averaged about one pound in weight. They provided a good forage base for great-blue herons which nested on Seedskadee and the Green River along with mink and other fish predators. The last known spawning run of significance was 1985, with few fish spawning up the Big Sandy River in 1992 and 1993.

### **Meadow Pussytoes (*Antennaria arcuata*)**

See the discussion at Special Status Plant Species in this chapter.

### **Large-Fruited Bladderpod (*Lesquerella macrocarpa*)**

See the discussion at Special Status Plant Species in this chapter.

## SPECIAL MANAGEMENT AREAS

### **Greater Sand Dunes ACEC (38,650 acres in the planning area)**

The Greater Sand Dunes are part of the larger Killpecker dune field, the largest active dune field in North America. The Killpecker dune field encompasses approximately 109,000 acres, extending 55 miles east from the Green River Basin across the Continental Divide into the Great Divide Basin. In 1982, the Greater Sand Dunes (including Boars Tusk) was designated an ACEC to protect geologic, cultural, and wildlife values with management objective to preserve and protect the integrity of the unique values in the area for future public use and enjoyment. The ACEC comprises about 38,650 acres (approximately 38 percent of the Killpecker dune field).

The ACEC is unique to the Wyoming Basin and contains values that are “geologically, aesthetically and biologically interesting” (McGrew, et al. 1974). In addition, the ACEC includes prehistoric and historic values, high scenic values, diverse wildlife and habitats, high recreation use, and high oil and gas values.

The Greater Sand Dunes ACEC encompasses portions of the Sand Dunes and Buffalo Hump Wilderness Study Areas (WSA). These WSAs are located in the western portion of the ACEC and are closed by policy to oil and gas leasing. This portion of the ACEC is closed to off-road vehicle use.

Crookston Ranch is closed to ORV use, and the road around Boars Tusk is closed. The unstabilized sand dunes in the eastern portion of the ACEC are open to ORV use. The remainder of the eastern portion is limited to existing roads and trails.

Recreation use, particularly with all-terrain vehicles (ATVs), is high in parts of the ACEC. An ORV open area is located on the unstabilized dunes in the eastern portion of the ACEC. A parking lot was developed to provide access to the dunes.

ATV user days in the ACEC are estimated at 3,200 a year and appear to be increasing. Other recreation user days such as sightseeing, hunting, horseback riding, and environmental education field trips in the ACEC are estimated at 10,000 per year.

The historic Crookston Ranch site (40 acres) is located in the ACEC south of the ORV parking lot. The site is potentially eligible for the national Register of Historic Places as a representative example of vernacular architecture within the Wyoming Basin homesteading era. The site is closed to surface disturbing activities. Some damage is occurring to the riparian area on the ranch site from ATV users and campers.



## AFFECTED ENVIRONMENT

open space. Management prescriptions are summarized in Appendix 3).

There has been less formal inventory for cultural resources in the Red Desert area than anywhere else in the planning area. The limited inventory indicates the same density and diversity of sites in the Red Desert area as elsewhere in the planning area. Several stone circle sites are located below Steamboat Mountain. A very old rock art site exists west of Black Rock.

Historic resources in the area include the Point of Rocks to South Pass freight road and a station at Freighters Gap. This historic linear corridor is significant on a regional level. The exact location of the Freightier Gap station is not known.

There are some sites related to early ranching in the Red Desert area, but most of these are on private land. A historical context for the area has not been written, and the significance of particular sites should not be evaluated without some kind of areal context.

The Red Desert area does not seem to have any particular unifying settlement pattern reflected in the prehistoric or historic record; however, there is a very limited data base to analyze. There are undoubtedly important sites in the sand dunes within the area. Otherwise, the Red Desert area probably does not differ remarkably from the remainder of the planning area.

The entire Red Desert Watershed Area is open to grazing.

The BLM-administered public lands within the watershed area are open to leasing, except those areas currently managed under the Interim Wilderness Management Policy and Guidelines for Lands under Wilderness Review (about 73,080 acres). Once final wilderness determinations are made, those areas not selected will be opened to leasing, although some areas may require special stipulations to protect unique resources.

Most of the watershed area is underlain with deep deposits of coal; however, the entire watershed does not have coal at depths economically feasible to mine. No coal mining activities are occurring in the watershed area at this time. The Great Divide Basin is encumbered by the coal withdrawal, which precludes disposal of the coal resource. About 1,710 acres of federal coal lands within that portion of the Coal Occurrence and Development Potential area would be open to further consideration for coal leasing and development (i.e., new competitive leasing, emergency leasing, lease modifications, and exchange proposals, under the Federal Coal Management Program) with appropriate and necessary conditions and requirements for protection of other land and resource values and uses (see Appendix 3).

Coal gas is present only where coal is found; thus, the potential exists for development in the southern half of the watershed area. Limited exploration and no development for coalbed methane has occurred.

Potential exists for development of mineral materials (sand, gravel, and volcanic rock).

A number of current mining claims affect the northeastern portion of the planning area, specifically areas north of the

Honeycomb Buttes and Oregon Buttes (Map 48). No Notices or Plans have been received for any of these claims.

The entire watershed area is open to seismic activity, except in wilderness study areas (although seismic activity can occur within WSAs depending upon the method used).

The Red Desert Watershed Area lies within the western portion of the Great Divide Basin, a 3,500-square mile internally drained basin. It is dominated by dry, shallow depressions that are the remnants of Pleistocene era lakes. Other geologic features found include badlands, flat-topped mesas, isolated buttes, and active sand dunes. Over 6 miles of faults lie in the northeastern part of the area. Landslides can occur around areas of steep terrain. Windblown sand is a common occurrence. Vertebrate fossils of scientific significance have been found in other parts of the planning area in formations like those in the Red Desert Watershed Area.

The watershed area provides many recreational opportunities. Sight-seeing and hunting are two of the most popular forms of recreation, while rock hunters can find a variety of interesting rocks, including petrified wood and agates around the Oregon Buttes area. Outstanding opportunities exist for solitude. Several types of tours are available to individuals or groups, including wagon train, horse, and mountain bike tours. The Red Desert backcountry byway was identified in the Green River RMP.

The management objectives are to develop, maintain, preserve, or enhance the various recreational activities such as camping, picnicking, winter sports, and collecting that occur in the Red Desert Watershed Area, provide for an optimum and satisfying visitor experience, and enhance hunting and fishing opportunities to maximize the visitors recreation experience. Camping restrictions limit camping to 14 days. ORV use has been limited to existing roads or trails.

Many roads and trails provide access into the area including a county road network and private and BLM roads.

The Red Desert Watershed Area is dominated by well to excessively drained soils from 10 to 40 inches deep over bedrock. The dominant soil types have a sandy loam, fine sandy loam, or loam surface and substrata. These soils formed on upland plains dissected by rocky ravines, short escarpments, and draws. Slopes range from 5 to 30 percent. Scattered throughout the basin are very deep, moderately well drained soils dominated by silty clays. These soils formed in level basins and on fans derived from alkaline and saline lacustrine deposits. Included are areas of playa lakes which seasonally retain water. Slopes range from 0 to 3 percent. The Killpecker Dune field, composed of active and dormant sand dunes, traverses the area. Slopes range from 5 to 30 percent.

Vegetation in the Red Desert Watershed Area primarily consists of big and low sagebrush communities found under the low density sagebrush classification (less than 35 percent ground cover). The big sagebrush community generally occupies areas where precipitation averages 7 to 9 inches per year and soils are sandy or loamy, well drained, and non-alkaline. The major shrub component of the big sagebrush community is Wyoming big sagebrush; other species com-



## AFFECTED ENVIRONMENT

Management of the ACEC is described in detail in the Green River RMP (USDI 1997) and summarized in Appendix 3). The ACEC is open to consideration of oil and gas leasing with appropriate mitigation (Appendix 3). Vibroseis activity will not occur within 300 feet of the historic trails. Shothole activity would not be allowed along the trails. Other geophysical operations would be allowed within the historic trails corridors if site specific analysis determines that no effects adverse to the visual integrity of the trails would occur.

The scenic vista of South Pass is among the most important historic landscapes because South Pass served as the primary mountain gateway to the West along the Oregon, Mormon Pioneer, Pony Express, and California National Historic Trails. The pass was the site where emigrant travelers traversed the Continental Divide. South Pass thus marks roughly the halfway point in the epic westward journey. The topographic setting of South Pass facilitated American settlement of the Pacific Northwest, thus solidifying United States sovereignty over that region. South Pass is located on the northwest edge of the Wyoming Basin — a desert-like geographical feature which extends south for 150 miles and forms a complete break in the Rocky Mountain chain.

The site on the pass where several commemorative markers have been placed is already listed on the National Register of Historic Places. In 1959, the National Park Service designated South Pass a National Historic Landmark (NHL). The National Park Service proposed a boundary for the NHL in 1984. An official boundary has not been delineated.

The area having the most historic value is the viewscape created by the Continental Divide, including the top rim of Pacific Butte on the south and the divide between waters flowing to Pacific Creek and the Sweetwater River on the north and east.

The ACEC also contains wildlife habitat values. In particular, elk use the area and two elk calving areas occur within the ACEC.

### **Special Status Plant Species ACEC (0 acres in the planning area)**

The Special Status Plant Species ACEC was designated in August 1997. Management priority and emphasis was given to maintaining or enhancing these species and their habitats. Although no species associated with the ACEC occur within the planning area, there is potential for other sensitive species (*Lesquerella macrocarpa*) to be added to the ACEC (see the special status plant species section of the affected environment). The management actions provided in the Green River RMP allow for consideration of other species to be added to this ACEC.

Special Status Plant species are those which are proposed for listing, officially listed (T&E), or candidates for listing as threatened or endangered by the Secretary of the Interior under the provisions of the Endangered Species Act; those listed or proposed for listing by a state in a category implying potential endangerment or extinction; and those designated by State Directors as sensitive.

### **Steamboat Mountain ACEC (43,310 acres in the planning area)**

The Steamboat Mountain ACEC was designated in August 1997 and a notice published in the Federal Register on July 10, 1998. The Federal Register notice indicated that the ACEC was 43,270 acres of BLM-administered public land. Updated information shows that there are 43,310 acres in the ACEC. The boundary did not change.

The Steamboat Mountain ACEC area contains approximately 43,310 acres of public lands. Forming the south end of the general location area are the talus slopes off the base of Steamboat Rim and Steamboat Mountain. Easterly, the area follows the road at the head of Split Rock Canyon northerly along the Continental Divide to the top of the dugway on Bush Rim. Here it follows a two-track trail northwesterly and north to Parnell Creek. The north area follows Parnell Creek downstream to Jack Morrow Creek, and then follows the road all the way to Indian Gap. From Indian Gap, it follows a two track southerly along the base of Steamboat Rim until it meets the existing Sand Dunes ACEC. From here it follows the Sand Dunes ACEC boundary until it reaches the talus slopes at the southern boundary.

The area has highly varied topographic features and ranges in elevation from 7,063 to 8,683 feet. Unique habitats of stabilized sand dunes occur here that are found nowhere else in the Field Office area. Tall sagebrush communities (up to 8-12 feet tall) provide escape cover, shelter, thermal protection, and parturition areas. An understory of bitterbrush and a variety of other shrubs and grasses provide forage. Some of these sagebrush have been estimated to be over 300 years old.

Livestock grazing occurs in the ACEC and consists mainly of summer use by cattle. Livestock grazing did not occur from 1991 to 1996. Currently, the vegetation in the ACEC is in good condition, partially due to a lack of livestock grazing, good yearly precipitation, and good growing seasons.

Limber pine and aspen communities provide habitat to a wide variety of wildlife but are limited in size and localities making them extremely important. Browsing by elk is definitely limiting aspen in many locations. Other mountain shrub communities such as serviceberry and mountain mahogany provide browse in deep snow conditions. Grass-covered ridgetops offer additional forage for elk during crucial winter periods.

Because of the terrain (steep slopes with dense sagebrush used for elk calving and high ridge tops utilized during the winter), elk use the area year round. Elk are the least tolerant to human disturbance of any of the big game species that inhabit the planning area. Activities tend to displace the elk great distances (to 3 miles) due to the extended sight distances in this desert terrain. Elk tend to abandon the Steamboat area rather than seek shelter in adjacent canyons because of the narrowness of benches and canyons and lack of hiding cover. Loss of crucial elk winter ranges in the Pine and Cedar Canyon areas due to intensive oil and gas development and human intrusion make the Steamboat area critical to the survival of this elk herd. Intensive development of any kind in the



**TABLE 3-1  
UNDERGROUND WATER CLASS**

| <b>Use Suitability<br/>Constituent<br/>or Parameter</b>  | <b>I<br/>Domestic<br/>Concentration<sup>1</sup></b> | <b>II<br/>Agriculture<br/>Concentration<sup>1</sup></b> | <b>III<br/>Livestock<br/>Concentration<sup>1</sup></b> |
|--|---|---|--|
| Aluminum (Al)  | ---   | 5.0   | 5.0  |
| Ammonia (NH <sub>3</sub> -N)   | 0.5   | ---   | ---  |
| Arsenic (As)   | 0.05  | 0.1   | 0.2  |
| Barium (Ba)  | 1.0   | ---   | ---  |
| Beryllium (Be)   | ---   | 0.1   | ---  |
| Boron (B)  | 0.75  | 0.75  | 5.0  |
| Cadmium (Cd)   | 0.01  | 0.01  | 0.05   |
| Chloride (Cl)  | 250.0   | 100.0   | 2,000.0  |
| Chromium (Cr)  | 0.05  | 0.1   | 0.05   |
| Cobalt (Co)  | ---   | 0.05  | 1.0  |
| Copper (Cu)  | 1.0   | 0.2   | 0.5  |
| Cyanide (CN)   | 0.2   | ---   | ---  |
| Fluoride (F)   | 1.4-2.4   | ---   | ---  |
| Hydrogen Sulfide (H <sub>2</sub> S)  | 0.05  | ---   | ---  |
| Iron (Fe)  | 0.3   | 5.0   | ---  |
| Lead (Pb)  | 0.05  | 5.0   | 0.1  |
| Lithium (Li)   | ---   | 2.5   | ---  |
| Manganese (Mn)   | 0.05  | 0.2   | ---  |
| Mercury (Hg)   | 0.002   | ---   | 0.00005  |
| Nickel (Ni)  | ---   | 0.2   | ---  |
| Nitrate (NO <sub>3</sub> -N)   | 10.0  | ---   | ---  |
| Nitrite (NO <sub>2</sub> -N)   | 1.0   | ---   | 10.0   |
| Nitrite (NO <sub>3</sub> +NO <sub>2</sub> )-N  | ---   | ---   | 100.0  |
| Oil & Grease   | Virtually free                                      | 10.0  | 10.0   |
| Phenol   | 0.001   | ---   | ---  |
| Selenium (Se)  | 0.01  | 0.02  | 0.05   |
| Silver (Ag)  | 0.05  | ---   | ---  |
| Sulfate (SO <sub>4</sub> )   | 250.0   | 200.0   | 3,000.0  |
| Total Dissolved Solids   | 500.0   | 2,000.0   | 5,000.0  |
| Uranium (U)  | 5.0   | 5.0   | 5.0  |
| Vanadium (V)   | ---   | 0.1   | 0.1  |
| Zinc (Zn)  | 5.0   | 2.0   | 25.0   |
| pH <sup>2</sup>  | 6.5-9.0 s.u.  | 4.5-9.0 s.u.  | 6.5-8.5 s.u.   |
| SAR  | ---   | 8   | ---  |
| RSC <sup>3</sup>   | ---   | 1.25 meq/l  | ---  |
| Combined Total<br>Radium 226 and<br>Radium 228 <sup>4</sup>  | 5 pCi/l   | 5 pCi/l   | 5 pCi/l  |
| Total Strontium 90 <sup>4</sup>  | 8 pCi/l   | 8 pCi/l   | 8 pCi/l  |
| Gross alpha particle<br>radioactivity (in-<br>cluding Radium 226<br>but excluding Radon<br>and Uranium) <sup>4</sup> | 15 pCi/l  | 15 pCi/l  | 15 pCi/l   |

<sup>1</sup> mg/l, unless otherwise indicated

<sup>2</sup> measured in standard units (s.u.)

<sup>3</sup> meq/l = milliequivalents per liter

<sup>4</sup> pCi/l = picoCuries per liter



**TABLE 3-2  
ALLOTMENT ACRES LOCATED WITHIN  
THE JACK MORROW HILLS PLANNING AREA**

| <b>Allotment Number</b> | <b>Allotment</b>           | <b>Category</b> | <b>Public Lands in Entire Allotment</b> | <b>Public Lands in Jack Morrow Hills</b> | <b>% of Public Lands in Allotment That Are in JMHCAP Area</b> |
|-------------------------|----------------------------|-----------------|---|--|---|
| 301600                  | 4th of July                | I               | 9,760                                   | 3,260                                    | 3   |
| 320700                  | Pacific Springs            | C               | 320                                     | 320                                      | 100   |
| 321400                  | Johnson Place              | C               | 60                                      | 60                                       | 100   |
| 321500                  | Crookston Ranch            | C               | 10                                      | 10                                       | 100   |
| 330700                  | Hay Meadow                 | C               | 380                                     | 380                                      | 100   |
| 1300700                 | Pacific Creek <sup>1</sup> | M               | 182,220                                 | 182,220                                  | 100   |
| 1300800                 | Bar X                      | M               | 4,060                                   | 4,010                                    | 99  |
| 1301100                 | Continental Peak           | M               | 81,970                                  | 81,970                                   | 100   |
| 1301200                 | Red Desert                 | M               | 243,200                                 | 73,090                                   | 30  |
| 1301300                 | Bush Rim                   | M               | 92,710                                  | 92,710                                   | 100   |
| 1301400                 | Steamboat Mountain         | I               | 33,650                                  | 32,610                                   | 97  |
| 1301500                 | Sands                      | I               | 105,210                                 | 100,440                                  | 95  |
| 1301800                 | Rock Springs               | M               | 1,009,790                               | 2,230                                    | 0.28  |
| 1310700                 | Middle Hay                 | C               | 298                                     | 298                                      | 100   |
| 1311400                 | Chiltons Place             | C               | 140                                     | 140                                      | 100   |
| 1311500                 | Houghton Ranch             | C               | 270                                     | 270                                      | 100   |

<sup>1</sup> An additional 1,170 acres of Bureau of Recreation Lands occur within the Pacific Creek Allotment (183,390 total federal acres).

**TABLE 3-3  
ALLOTMENT/OPERATOR DATA FOR JMH PLANNING AREA**

| Allotment                                 | Operator            | Livestock Number | Class of Livestock | Use Period  | AUMs  | Permitted Use |           |        | Cattle AUMs    | Sheep AUMs       |    |
|---|---------------------|------------------|--------------------|-------------|-------|---------------|-----------|--------|----------------|------------------|----|
|   |                     |                  |                    |             |       | Active        | Suspended | Total  |                |                  |    |
| 4th of July<br>(numbers adjusted by 0.03) | D. Mines            | 13               | C                  | 05/16-07/20 | 12    | 25            | 16        | 41     | 25             |                  |    |
|   |                     | 13               | C                  | 10/01-12/06 | 13    |               |           |        |                |                  |    |
| Pacific Springs                           | Blair & Hay         | 63               | C                  | 06/01-06/30 | 29    | 29            |           | 29     | 29             |                  |    |
| Johnson Place                             | D. Mines            | 2                | C                  | 05/01-09/30 | 10    | 10            |           | 10     | 10             |                  |    |
| Crookston Ranch                           | DeLambert           | 2                | C                  | 06/01-07/31 | 4     | 4             |           | 4      | 4              |                  |    |
| Hay Meadow                                | Blair & Hay         | 157              | C                  | 10/01-11/03 | 91    | 91            |           | 91     | 91             |                  |    |
| Pacific Creek                             | DeLambert           | 75               | C                  | 05/01-05/02 | 5     | 5             | 4,526     | 5      | 5              | 22               |    |
|   | Magagna Brothers    | 220              | S                  | 10/01-10/15 | 22    | 22            |           | 22     |                |                  |    |
|   | Blair & Hay         | 949              | C                  | 05/01-12/31 | 7,032 | 7,030         |           | 11,556 | 7,030          |                  |    |
|   | Erramouspe Brothers | 750              | S                  | 07/15-07/16 | 10    | 10            |           | 10     |                |                  | 10 |
|   | G&E Livestock       | 2,835            | S                  | 12/01-12/02 | 37    | 38            |           | 38     |                |                  | 38 |
|   | Bar X Sheep         | 1,119            | S                  | 05/25-05/26 | 15    | 15            |           | 15     |                |                  | 15 |
|   | White Acorn         | 90               | C                  | 05/01-05/31 | 92    | 90            |           | 90     | 90             |                  | 90 |
| Bar X<br>(numbers adjusted by 0.99)       | Bar X Sheep         | 210              | C                  | 06/01-10/15 | 463   | 463           |           | 463    | 463            |                  |    |
| Continental Peak                          | Magagna Brothers    | 572              | S                  | 05/01-10/31 | 630   | 630           | 41        | 671    | 1,635<br>2,923 | 630<br>540<br>40 |    |
|   | Robert Hellyer      | 293              | C                  | 05/01-10/31 | 1,631 | 1,635         | 613       | 2,248  |                |                  |    |
|   | Erramouspe Brothers | 531              | C                  | 05/11-10/31 | 2,923 |               |           |        |                |                  |    |
|   |                     | 1,555            | S                  | 05/19-07/15 | 540   | 3,463         | 347       | 3,810  |                |                  |    |
|   | Bar X Sheep         | 3,060            | S                  | 05/25-05/26 | 40    | 40            |           | 40     |                |                  |    |
|   | White Acorn         | 17               | C                  | 05/01-05/31 | 17    | 17            |           | 17     |                |                  |    |

**TABLE 3-3  
ALLOTMENT/OPERATOR DATA FOR JMH PLANNING AREA**

| Allotment  | Operator            | Livestock Number | Class of Livestock | Use Period  | AUMs  | Permitted Use |           |       | Cattle AUMs | Sheep AUMs |
|--|---------------------|------------------|--------------------|-------------|-------|---------------|-----------|-------|-------------|------------|
|  |                     |                  |                    |             |       | Active        | Suspended | Total |             |            |
| Red Desert<br>(numbers<br>adjusted by 0.30)            | Magagna Brothers    | 847              | S                  | 05/01-10/31 | 953   | 946           | 19        | 965   | 1,251       | 946        |
|  | Blair & Hay         | 175              | C                  | 05/01-12/15 | 1,251 | 1,251         | 1,962     | 3,213 |             |            |
|  | Erramouspe Brothers | 1,095            | S                  | 05/01-05/06 | 43    | 43            |           | 43    |             |            |
|  | Bar X Sheep         | 204              | C                  | 05/15-10/14 | 935   | 935           | 266       | 1,201 |             |            |
|  | White Acorn         |                  |                    |             |       | 8             | 13        | 21    |             |            |
| Bush Rim<br>(numbers<br>adjusted by 0.99)              | Magagna Brothers    | 640              | S                  | 10/01-10/15 | 63    | 64            |           | 64    | 3,814       | 64         |
|  | Blair & Hay         | 815              | S                  | 05/02-06/01 | 166   | 166           |           | 166   |             |            |
|  | Erramouspe Brothers | 3,300            | S                  | 04/30-05/01 | 43    | 22            |           | 22    |             |            |
|  | Bar X Sheep         | 967              | C                  | 05/25-09/15 | 3,814 | 3,814         | 2,456     | 6,270 |             |            |
|  | White Acorn         |                  |                    |             |       | 71            | 75        | 146   |             |            |
| Steamboat<br>Mountain<br>(numbers<br>adjusted by 0.97) | Blair & Hay         | 378              | S                  | 05/02-06/01 | 78    | 79            |           | 79    | 822         | 79         |
|  | Bar X Sheep         |                  |                    |             |       | 19            |           | 19    |             |            |
|  | D. Mines            | 413              | C                  | 07/21-09/30 | 821   | 822           | 1,174     | 1,996 |             |            |
| Sands<br>(numbers<br>adjusted by 0.95)                 | Midland Dunton      | 1,647            | S                  | 11/27-11/30 | 44    | 44            |           | 44    | 1,194       | 44         |
|  |                     | 269              | S                  | 10/01-12/31 | 162   | 206           | 19        | 225   |             |            |
|  | DeLambert           | 199              | C                  | 05/06-11/05 | 1,206 | 1,194         | 336       | 1,530 |             |            |
|  | G&E Livestock       | 7,790            | S                  | 04/25-04/25 | 51    | 51            |           | 51    |             |            |
|  | GZ Livestock        | 202              | C                  | 05/15-12/15 | 1,696 | 1,699         | 823       | 2,522 |             |            |
|  |                     | 91               | C                  | 05/10-11/11 | 558   | 552           | 337       | 889   |             |            |
|  | White Acorn         |                  |                    |             |       | 51            |           | 51    |             |            |
|  | Roberts Livestock   | 1,105            | S                  | 11/01-12/14 | 320   | 324           | 39        | 363   |             |            |
| Rock Springs*<br>(numbers<br>adjusted by<br>0.0028)    | Blair & Hay         | 4                | S                  | 03/01-04/30 | 2     | 2             |           | 2     | 1           | 2          |
|  |                     | 1                | C                  | 05/01-12/15 | 1     | 1             |           | 1     |             |            |
|  |                     | 4                | S                  | 12/16-02/28 | 2     | 4             | 1         | 5     |             |            |
|  | D. Mines            | 1                | C                  | 05/15-12/15 | 4     | 4             | 1         | 5     |             |            |
| Middle Hay   | Blair & Hay         | 15               | C                  | 06/01-07/31 | 16    | 16            |           | 16    | 16          |            |
| Chiltons Place   | D. Mines            | 3                | C                  | 05/01-09/30 | 15    | 15            |           | 15    | 15          |            |

**TABLE 3-3  
ALLOTMENT/OPERATOR DATA FOR JMH PLANNING AREA**

| Allotment                       | Operator                   | Livestock Number | Class of Livestock | Use Period  | AUMs | Permitted Use |           |       | Cattle AUMs | Sheep AUMs |
|---------------------------------|----------------------------|------------------|--------------------|-------------|------|---------------|-----------|-------|-------------|------------|
|                                 |                            |                  |                    |             |      | Active        | Suspended | Total |             |            |
| Houghton Ranch                  | Chilton Land and Livestock | 11               | C                  | 05/02-06/01 | 11   | 12            |           | 12    | 12          |            |
| Total AUMs in Jack Morrow Hills |                            |                  |                    |             |      |               |           |       | 22,767      | 3,265      |

**TABLE 3-4  
PREVIOUS 5-YEAR LIVESTOCK GRAZING USE IN JMH PLANNING AREA**

| <b>Allotment</b> | <b>Operator</b>          | <b>1998</b> | <b>1997</b> | <b>1996</b> | <b>1995</b> | <b>1994</b> | <b>Average Use Total (5 Years)</b> | <b>Average Non-use Total (5 Years)</b> | <b>Average Use Total for Cattle over 5 Years</b> | <b>Average Use Total for Sheep over 5 Years</b> |
|------------------|--------------------------|-------------|-------------|-------------|-------------|-------------|------------------------------------|--|--|---|
| 4th of July      | D. Mines                 | 12          |             |             |             |             | 2                                  |  | 2  |   |
|                  | Ken Routh                |             | 25*         | 25*         |             |             |                                    | 25                                     |  |   |
| Pacific Springs  | Blair & Hay              | 29          | 29          | 29          | 29          | 29          | 29                                 |  |  | 29  |
| Johnson Place    | D. Mines                 | 10          |             |             |             |             | 2                                  |  | 2  |   |
|                  | Chilton Land & Livestock |             | 10          | 10          | 10          | 10          | 8                                  |  | 8  |   |
| Crookston Ranch  | DeLambert                | 4           | 4           | 4           | 4           | 4           | 4                                  |  | 4  |   |
| Hay Meadow       | Blair & Hay              | 91 *        | 91 *        | 91 *        | 91 *        | 91 *        |                                    | 91                                     |  |   |
| Pacific Creek    | DeLambert                | 5 *         | 5 *         | 5 *         | 5 *         | 5 *         |                                    | 5                                      |  |   |
|                  | Magagna Brothers         | 39          | 54          | 49          | 100         | 81          | 64.6                               |  |  | 65  |
|                  | Blair & Hay              | 5,496       | 4,522       | 2,187       | 4,450       | 3,294       | 3,990                              |  | 3,990  |   |
|                  | Erramouspe Brothers      | 10 *        | 10 *        | 10 *        | 10 *        | 10 *        |                                    | 10                                     |  |   |
|                  | G&E Livestock            | 38 *        | 38 *        | 38 *        | 38 *        | 38 *        |                                    | 38                                     |  |   |
|                  | Bar X Sheep              | 15 *        | 15 *        | 15 *        | 15 *        | 15 *        |                                    | 15                                     |  |   |
|                  | White Acorn              | 90 *        | 90 *        | 90 *        | 90 *        | 90 *        |                                    | 90                                     |  |   |
| Bar X            | Bar X Sheep              | 323         | 414         | 439         | 248         | 257         | 336.2                              |  | 336  |   |

**TABLE 3-4  
PREVIOUS 5-YEAR LIVESTOCK GRAZING USE IN JMH PLANNING AREA**

| <b>Allotment</b>   | <b>Operator</b>     | <b>1998</b> | <b>1997</b> | <b>1996</b> | <b>1995</b> | <b>1994</b> | <b>Average Use Total (5 Years)</b> | <b>Average Non-use Total (5 Years)</b> | <b>Average Use Total for Cattle over 5 Years</b> | <b>Average Use Total for Sheep over 5 Years</b> |
|--------------------|---------------------|-------------|-------------|-------------|-------------|-------------|------------------------------------|--|--|---|
| Continental Peak   | Magagna Brothers    | 198         | 135         | 104         | 177         | 238         | 170.4                              |  |  | 170   |
|                    | Robert Hellyer      | 1,629       | 1,637       | 1,485       | 1,202       | 1,043       | 1399.2                             |  | 1,399  |   |
|                    | Erramouspe Brothers | 3,463 *     | 3,463 *     | 3,463 *     | 3,463 *     | 3,463 *     |                                    | 3463                                   |  |   |
|                    | Bar X Sheep         | 41 *        | 41 *        | 41 *        | 41 *        | 41 *        |                                    | 32.8                                   |  |   |
|                    | White Acorn         | 17 *        | 17 *        | 17 *        | 17 *        | 17 *        |                                    | 13.6                                   |  |   |
| Red Desert         | Magagna Brothers    | 223         | 136         | 160         | 211         | 289         | 203.8                              |  |  | 204   |
|                    | Blair & Hay         | 117         | 375*        | 375*        | 375 *       | 375 *       | 23.4                               | 300                                    | 23   |   |
|                    | Erramouspe Brothers | 13*         | 13*         | 13*         | 13*         | 13*         |                                    | 13                                     |  |   |
|                    | Bar X Sheep         | 71          | 37          | 279 *       | 55          | 21          | 36.8                               | 55.8                                   | 37   |   |
|                    | White Acorn         | 2*          | 2*          | 2*          | 2*          | 2*          |                                    | 2                                      |  |   |
| Bush Rim           | Magagna Brothers    | 33          | 38          | 33          | 58          | 86          | 49.6                               |  |  | 50  |
|                    | Blair & Hay         | 166 *       | 166 *       | 166 *       | 166 *       | 166 *       |                                    | 132.8                                  |  |   |
|                    | Erramouspe Brothers | 22 *        | 22 *        | 22 *        | 22 *        | 22 *        |                                    | 17.6                                   |  |   |
|                    | Bar X Sheep         | 926         | 1,152       | 3,814 *     | 572         | 1,063       | 742.6                              | 762.8                                  | 743  |   |
|                    | White Acorn         | 71 *        | 71 *        | 71 *        | 71 *        | 71 *        |                                    | 56.8                                   |  |   |
| Steamboat Mountain | Blair & Hay         | 78          | 78 *        | 78 *        | 78 *        | 78 *        | 15.6                               | 62.4                                   | 16   |   |
|                    | Bar X Sheep         | 19 *        | 19 *        | 19 *        | 19 *        | 19 *        |                                    | 19                                     |  |   |
|                    | D. Mines            | 386         |             |             |             |             | 77.2                               |  | 77   |   |





**TABLE 3-5  
RANGELAND STANDARDS  
NOT MET (N) OR UNKNOWN (U)  
FY 99**

| Allotment               | Rangeland Standards Not Met<br>or Unknown |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|
|                         | 1   | 2 | 3 | 4 | 5 | 6 |
| Bar-X                   |   |   |   |   | U |   |
| Bush Rim                |   |   |   |   | U |   |
| Continental Peak        |   |   |   |   | U |   |
| 4 <sup>th</sup> of July |   |   |   |   | U |   |
| Pacific Springs         |   |   |   |   | U |   |
| Pacific Creek           | N   | N |   |   | U |   |
| Red Desert              |   |   |   |   | U |   |
| Sands                   |   |   |   |   | U |   |
| Steamboat Mountain      |   | N |   |   | U |   |



















































