

CHAPTER 3

AFFECTED ENVIRONMENT

3.0 INTRODUCTION

This chapter describes the existing conditions of the affected environment for the proposed Lower Bush Creek CBM exploratory pilot project area (project area, analysis area). See Figure 2.1, Chapter 2 for details of the proposed project components and the area involved. The project area is located outside special status plant species areas, big game crucial winter range and parturition areas, select cultural resource sites and historic trails, and areas of critical environmental concern (ACEC). However, the project area is within the Great Divide Basin Wild Horse Herd Management Area and the Red Desert Watershed Management Area. Figure 2.1 shows the leases involved in the project and project component locations.

Elements of the human environment, including critical elements required by law or executive order, their status, and their potential to be affected by the Proposed Action or alternatives are listed in Table 3.1. Those items listed as ‘none present’ would not be affected or impacted by the Proposed Action or the No Action Alternatives and are not addressed further in the document. The impact analysis area for each resource is found in the right-hand column.

**TABLE 3.1
CRITICAL AND OTHER ELEMENTS OF THE HUMAN ENVIRONMENT**

Element	Project Area Status	Addressed in Text
Geology/Minerals/Paleontology	Potentially affected	Yes
Climate and Air Quality	Potentially affected	Yes
Soils	Potentially affected	Yes
Water Resources (including surface and groundwater quality)	Potentially affected	Yes
Vegetation/Wetlands/Noxious Weeds (including riparian zones, invasive species, threatened and endangered species, and special status species)	Potentially affected	Yes
Range Resources and Other Land Uses	Potentially affected	Yes

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Element	Project Area Status	Addressed in Text
Wildlife/Fisheries (including threatened and endangered species, and other special status species)	Potentially affected	Yes
Recreation	Potentially affected	Yes
Visual Resources	Potentially affected	Yes
Cultural Resources	Potentially affected	Yes
Socioeconomics	Potentially affected	Yes
Transportation	Potentially affected	Yes
Health and Safety	Potentially affected	Yes
Noise	Potentially affected	Yes
Areas of Critical Environmental Concern	None present	No
Prime or Unique Farmlands	None present	No
Floodplains	None present	No
Native American Religious Concerns	Potentially affected	Yes
Hazardous or Solid Wastes	Potentially affected	Yes
Wild and Scenic Rivers	None present	No
Wilderness	None present	No

3.1 GEOLOGY/MINERALS/PALEONTOLOGY

3.1.1 PHYSIOGRAPHY, TOPOGRAPHY, AND LANDFORMS

The analysis area is located in the Red Desert Watershed Area of the Great Divide Basin, which is also known as the Red Desert Basin. The Great Divide Basin, so named for its position on the Continental Divide, is one of several interior basins in south-central Wyoming sometimes referred to collectively as the Wyoming Basins. The Great Divide Basin is hydrographically closed and asymmetric. It is surrounded by uplifts including the Axial Arch on the south, the Rock Springs Uplift on the west, the Sweetwater Arch on the north, and the Rawlins and Sierra Madre Uplifts on the east. Elevations range from 9,225 feet on Whiskey Peak to 6,500 feet on the Basin's floor. The elevations of the proposed project area are between approximately 6,760 and 6,960 feet. Major water resources in this portion of the basin include the Chain Lakes area and numerous playas that serve as drainage basins for intermittent streams. Bush Creek is the major drainage near the project

area and is fed by numerous ephemeral drainages. Water in the Basin is also available as a point resource in the form of seeps and springs; however, no springs or seeps are known or identified on topographic maps within the project area.

3.1.2 GEOLOGY

The project area lies within the northern part of the Great Divide Basin. The Basin is a product of the Laramide Orogeny and is defined by Dickison, et al. (1988) as a ponded basin because the Paleocene fluvial drainages of such areas were blocked at times to form large freshwater lakes or playas, in the case of the Red Desert Sub-basin, Lake Gosiute. During the two million years of deposition for Lake Gosiute, great numbers of fossil fish, reptiles, birds, and plants representing a subtropical environment were preserved in the lake sediments. The lake had classically been considered a freshwater lake; however, recent studies have indicated that periods of increased salinity occurred in the lake's depositional history. By the early Tertiary the uplifted areas surrounding the basin were in place and from the lower Paleocene to the Upper Eocene Fort Union, Wasatch, Green River and Washakie formations were laid down. The depositional environments for these formations are quite varied and include alluvial fans as well as fluvial and lacustrine environments.

Bedrock under the Central Pilot Area is the Wasatch formation, main body (Case, et al. 1998). See Figure 3.1 for bedrock geology of the project area. Surface geology of the area is expressed as residuum and eolian deposits at the locations for Fed. 21-21 and the Fed. 23-21. The Fed. 41-21, 43-21, and 21-22 are located on playa and eolian features. See Figure 3.2 for surface geology. The playa is not an active wetland at this time. The Fed. 23-22 is located on bedrock slope wash. The Fed. 41-22 and 21-23 are located on the boundary between the slope wash and terrace and eolian deposits. The Fed. 43-22 and 23-23 are both on terrace and eolian deposits (Case, et al. 1998). Bedrock under the North Pilot Area is the Tipton Shale of the Green River Formation. Surface geology at most of the well locations is expressed as bedrock, slope wash, and eolian deposits. The exception is the Fed. 21-25, where surface geology is alluvium of stream and river deposits (Case, et al. 1998).

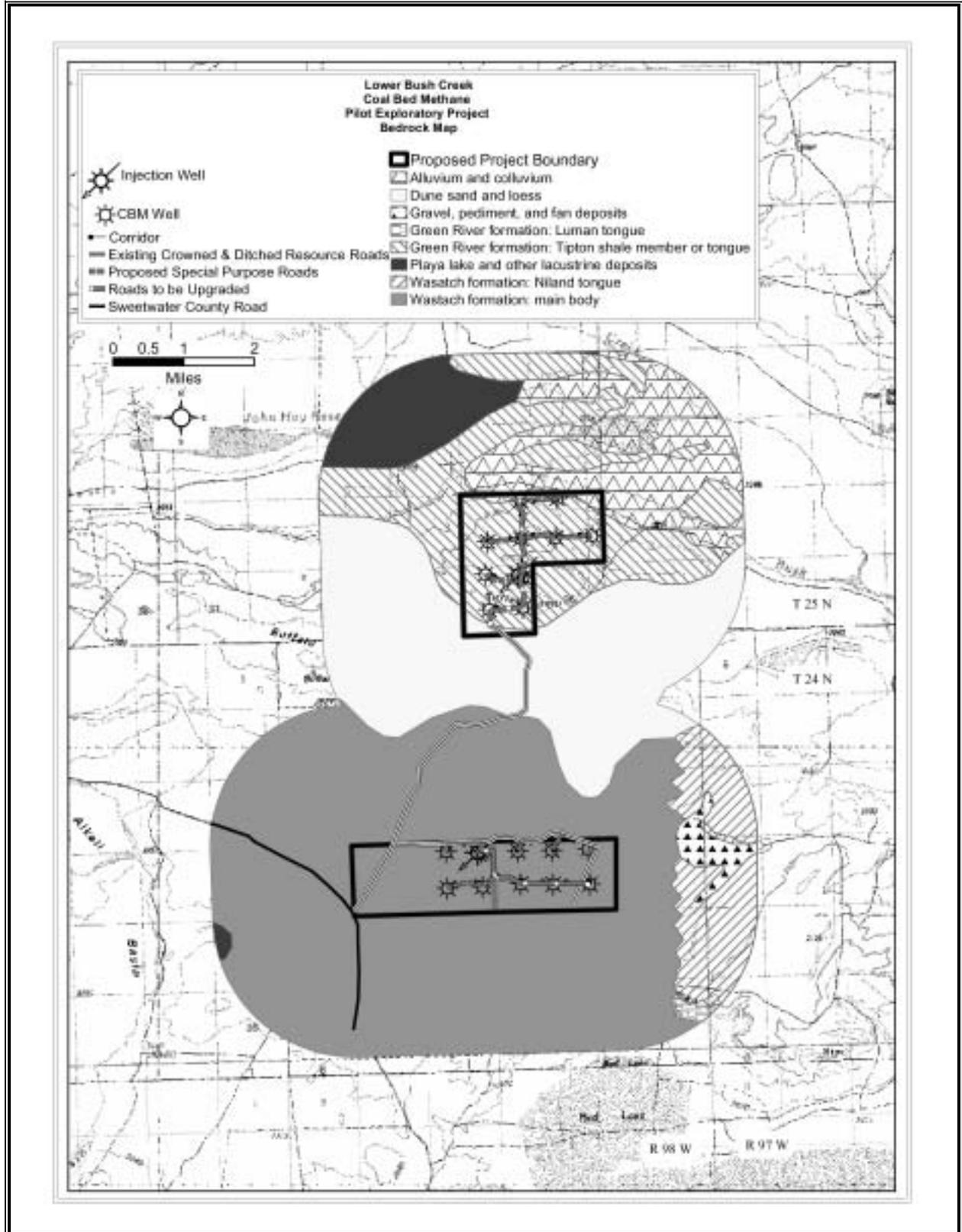
Sediments in the project area are generally residual or colluvial and are a tan sandy silt or silty sand with little organic content. The majority of the project area has rounded to angular siliceous pebbles and small cobbles in moderate to dense quantities on the surface. Occasional dune areas exist within the project area. These are coppice dunes, sand captured by vegetation. An extensive dune field is located south of the project area.

3.1.3 MINERAL AND ENERGY RESOURCES

The primary mineral commodities occurring in Sweetwater County are coal, natural gas, oil, and trona. On-going mineral development in the general area has been oil and gas exploration and

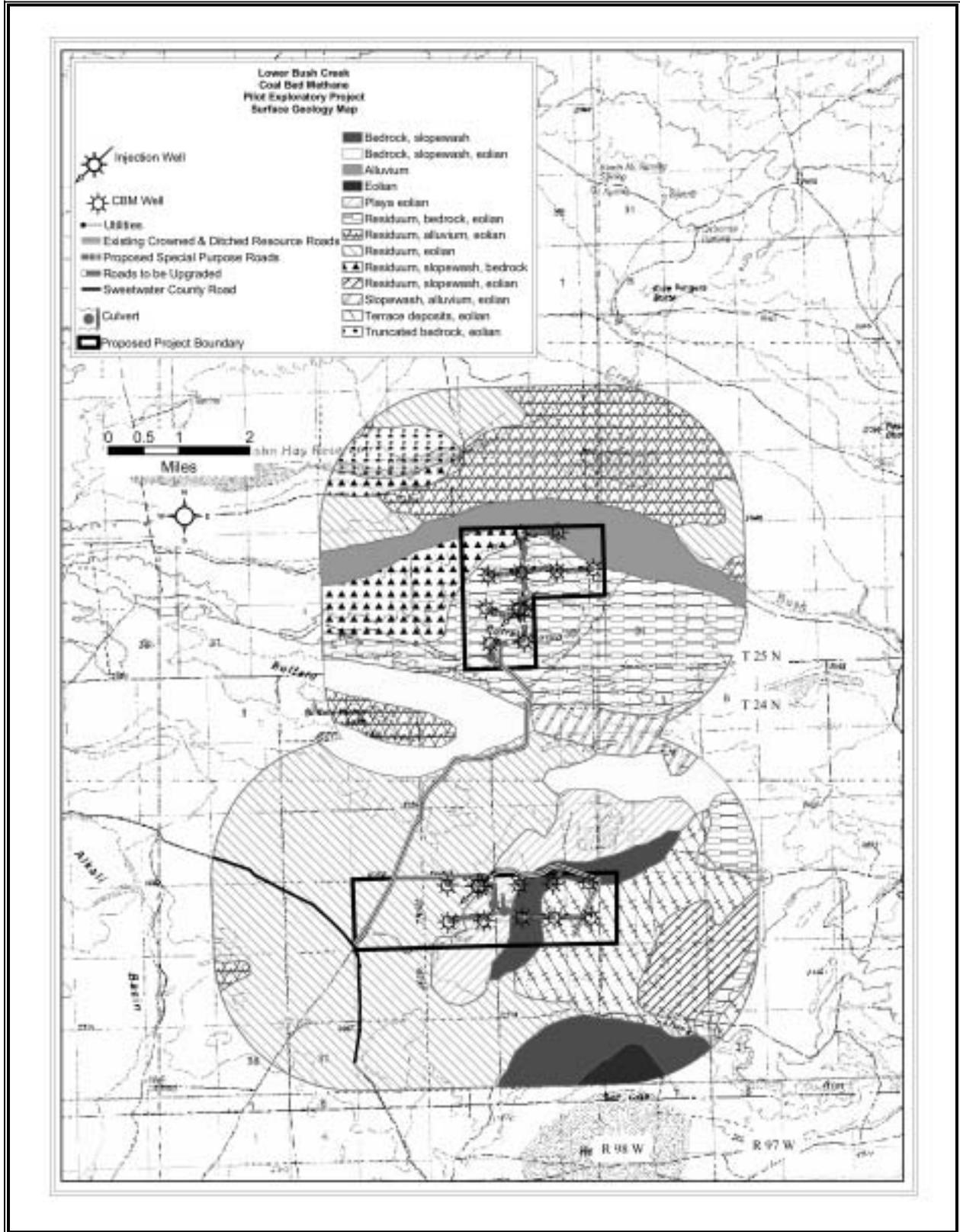
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Figure 3.1 Bedrock Found Within Project Area and Vicinity



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Figure 3.2 Surface Geology Found Within Project Area and Vicinity



production. As of August 11, 2003, BLM records showed a total of 23 wells drilled or shut-in in that portion of the Red Desert Watershed Area located outside of the Jack Morrow Hills planning effort area (see Figure 3.3). Since the original analysis was written, 7 APDs have been submitted and are under review. Two APDs have been approved but have yet to be drilled: the Vermillion Basin 27-6 located in Section 27 of T. 24 N., R. 98 W., and the Jade Road 17-11 located in Section 17, T. 25 N., R. 98 W. Other activity is occurring or pending in the Rawlins Field Office including an 11 well CBM exploratory proposal located in T23N, R97W.

3.1.4 GEOLOGIC HAZARDS

Potential geologic hazards include landslides and known or suspected active faults. Landslide potential is greatest in areas where steep slopes occur, particularly where the geologic dip of rock formations are steep and parallel to slope, or where erosional undercutting may occur. Landslides occur outside of the project area in steeper regions of the surrounding uplifts.

Sweetwater County has been subject to 31 earthquakes between 1888 and 1995, ranging in magnitude from 2.2 to 5.3 (Case 1999). A recent earthquake occurred on February 3, 1995 in the area. This earthquake's epicenter was near Little America, Wyoming. The quake had a magnitude of 5.3 and was felt throughout the state and as far away as Salt Lake City. The quake was associated with the collapse of a portion of a trona mine.

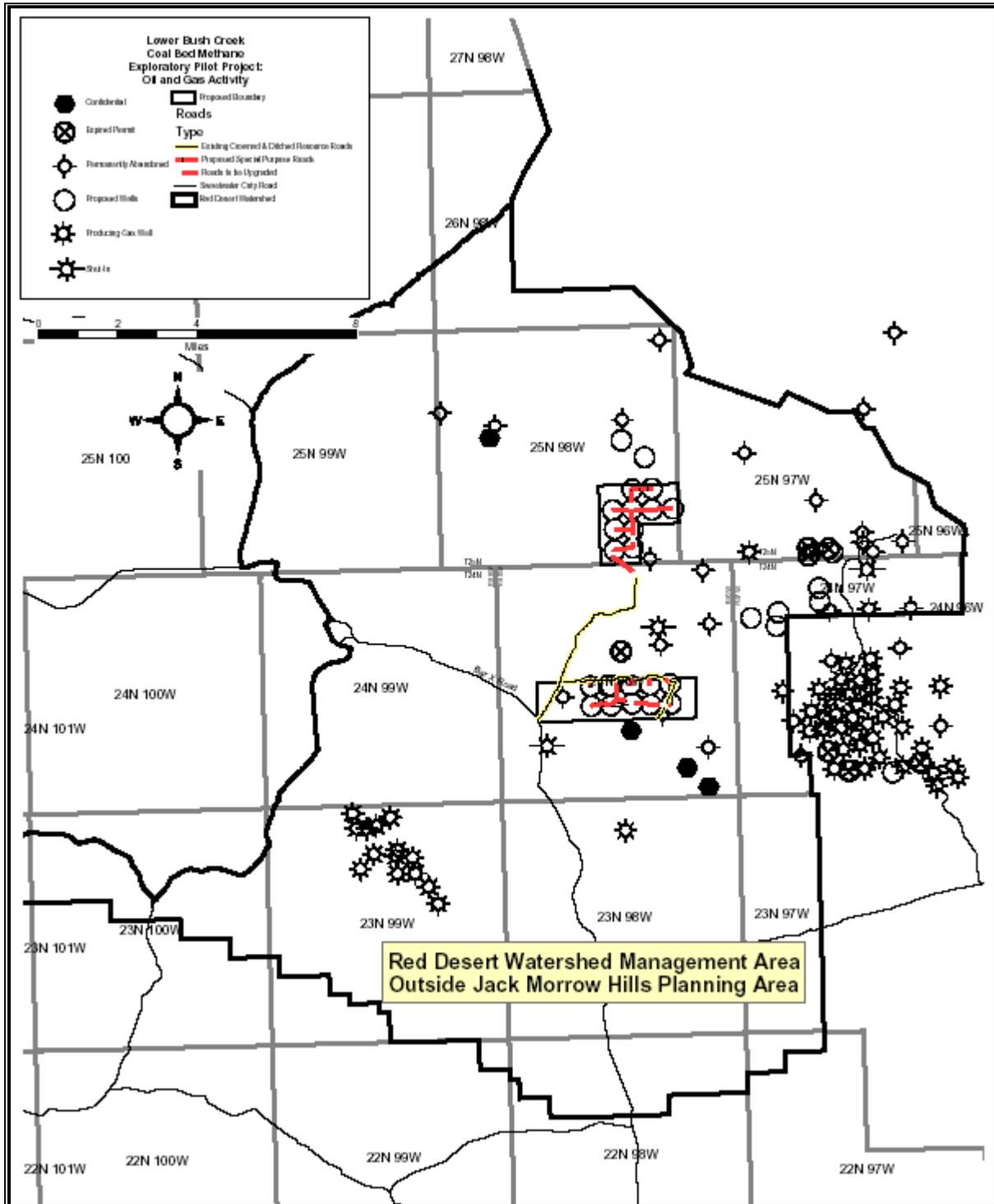
Fault zones in the geographic region area have been recurrently active in the past 20 million years. However, their activity is poorly defined or nonexistent in recent (Quaternary) times (Case, et al. 1995). Known or suspected active faults are located on the northern and southern boundaries of the County (Case and Green 2000). Sand dunes are also considered potential geologic hazards. No active dunes are found in the analysis area.

In summary, slope gradients in the project area are mild to moderate, but generally best described as mild. Potential for regional geologic hazards in the project area is low. The most likely hazard existing in the project area is potential for unstable soils to move.

3.1.5 PALEONTOLOGY

Paleontologic resources include the remains or traces of any prehistoric organism that have been preserved by natural processes in the earth's crust (BLM Information Bulletin WY-93-371). Energy minerals such as coal, oil shale, lignite, bitumen, asphalt, and tar sands, as well as some industrial minerals such as phosphate, limestone, diatomaceous earth, and coquina, while of biologic origin, are not considered fossils in themselves. However, fossils of scientific interest may occur within or in association with such materials. Fossils of scientific interest include those of particular interest to professional paleontologists and educators. Vertebrate fossils are always considered to be of

Figure 3.3 Oil and Gas Activity and Well Status in the Red Desert Watershed Management Area Outside Jack Morrow Hills Planning Area and Vicinity



scientific interest. The State Director and field managers, in consultation with BLM staff paleontologists or other expertise, may place other kinds of fossils in this category.

The BLM has established conditions for ranking areas based on potential to contain fossils of scientific interest. The Wasatch and Green River formations have a high potential for fossils of scientific interest. Two sites are known in or near the analysis area and are categorized as Condition 1 for paleontological resources; however, one site is located away from both pods and proposed and existing access roads. Another formation known as the Tipton Shale of the Green River Formation is a known source for fossils; however, no fossils of scientific interest are known to occur from this formation in the project area.

3.2 CLIMATE

The climate of southwestern Wyoming is classified as arid to semi-arid mid-continental (dry and cold) climate regime. The area is characterized by cold, dry winters, dry summers, and a short growing season. Mean annual precipitation is approximately 9 inches and is heaviest during the late winter and spring months. Approximately 20 percent of the precipitation falls as snow. Mean January temperature for the Red Desert Basin is 21 degrees while the average July temperature for this area is 66 degrees. Prevailing winds are from the west and southwest. These winds are relatively constant and have an average speed of between 12 and 14 miles per hour.

3.3 AIR QUALITY

Although specific air quality monitoring is not conducted in the immediate project area, the State of Wyoming has used monitoring in the Jack Morrow Hills planning area (approximately 10 miles west) to determine that air quality conditions in the region is in compliance with Wyoming Ambient Air Quality Standards (WAAQS) and National Ambient Air Quality Standards (NAAQS). The Supplemental Draft Impact Statement for the Jack Morrow Hill Coordinated Activity Plan /Draft Green River Resource Management Plan Amendment (2003) provides a specific discussion on monitoring data. This data is incorporated by reference and can be found in section 3.8.2 (pg 3-55) in the aforementioned document. Air quality in this area is considered excellent, as characterized by limited emission sources (few industrial facilities and residential emissions found in small communities and isolated ranches) and good atmospheric dispersion conditions, resulting in relatively low air pollutant concentrations.

The Green River Basin Visibility Study (GRBVS, a cooperative effort funded by Federal, state, and industry) was completed in September 2000. This study was designed to characterize visibility in the Green River Basin area of southwest Wyoming to determine concentrations of pollutants that cause visibility impairment. The final report for the study is not yet available (Potter 2003). The GRBVS monitoring system was comprised of three automatic cameras, a nephelometer, transmissometer, and aerosol monitor.

The Air Quality Division presented results and conclusions based on the first two years of GRBVS visibility monitoring data (August 1, 1996 – July 31, 1998) to the Air Quality Advisory Board and public at large on January 6, 2000 in Green River, Wyoming. Improvements are indicated in the data

of those initial years.

In February of 1998, gaseous monitoring equipment was installed at the GRBVS base monitoring site to monitor for nitrogen oxides (NO_x, NO, NO₂) and ozone. The gaseous monitoring equipment was installed to verify where the area is with respect to the ambient air quality standards and was funded solely by the Wyoming Department of Environmental Quality Air Quality Division. Gaseous monitoring continued through December 31, 2001. To yield further information on the range of visual air quality in the Basin, the Division funded continued visibility monitoring at the GRBVS base monitoring site through September 30, 2000. A number of monitoring stations for particulate matter are found in Sweetwater County, two of which are found in the Great Divide Basin. Neither has exceeded the air quality standard for PM-10. Air quality in the area is generally excellent with measured background concentrations of all criteria pollutants well below established standards.

3.4 SOILS

Soils in the project area generally have poorly developed structure and therefore have relatively weak internal cohesion. The primary soil association in the project area is the Teagulf-Huguston-Haterton. The soils of this association are deep to very shallow, well-drained soils, which occur on rolling to moderately steep upland plains, which are dissected by ravines, short escarpments and draws. Teagulf soils are Haplocalcids present on undulating upland plains. They are moderately deep, fine sandy loams that have a high calcium carbonate layer in the subsoil and are underlain by sandstone or shale. Huguston soils are Torriorthents present on rolling upland plains but are also present on short escarpments, rocky ravines and breaks. These are shallow, fine sandy loams that are underlain by soft sandstone. Haterton soils are Torriorthents also found in escarpments, rocky ravines and breaks. These are shallow loam soils and are underlain by shale rather than sandstone (see Figure 3.5).

The southern part of the project area in T24N R98W is dominated by sandy loam and sandy clay loam soils with hard sandstone bedrock generally at depths of 20 to 40 inches below the surface. These soils have high concentrations of carbonates, usually within 12 to 18 inches of the surface. Because of their sandy surface texture they are susceptible to wind erosion. These soils are found on the gently rolling residual uplands dominated by sagebrush.

The uplands are bisected by and intermittent drainage in the western part of Section 22. Soils on the alluvial fans and terraces associated with this drainage are generally silt loam and clay loam greater than 60 inches to bedrock although some shale bedrock may be found closer to the surface along the fringes. These soils are strongly calcareous and highly saline. Because of the high clay content these soils have a high shrink swell capacity. Vegetation is dominated by salt tolerant species including Gardener saltbush, greasewood, Indian ricegrass, and *Poa* species.

The hill slopes between the drainage and the uplands are dominated by sandy loam and loam soils with bedrock generally around 20 inches or less. The northern

part of the project area in T25N R98W is dominated by clay loam and loam soils with shale or sandstone bedrock generally at depths of 20 to 40 inches below the surface. The upper slopes in proximity to Buffalo Hump have bedrock closer to the surface. These soils are calcareous and moderately saline. Vegetation is dominated by Gardner saltbush and sagebrush.

The alluvial fans on the northern edge of the project area are influenced by Bush Creek drainage. This floodplain is dominated by silt loam and silty clay loam soils greater than 60 inches to bedrock. These soils are strongly alkaline and have a high shrink swell capacity. These soils are highly susceptible to water erosion as is evidenced by gulying in side drainages, cow paths, and an old two-track trail. Vegetation is dominated by greasewood (Sandy Grazing Final Environmental Impact Statement, BLM-1978).

In addition to these soils, a number of stabilized or dormant dune complexes of various types and sizes are present in the surrounding area. These dunes have been stabilized relatively recently by low grasses and shrubs. Most of the sand within the dunes is fine-grained and moderately well sorted and is probably derived from Bridger, Mesaverde, or Foxhills formation sandstones.

3.5 WATER RESOURCES

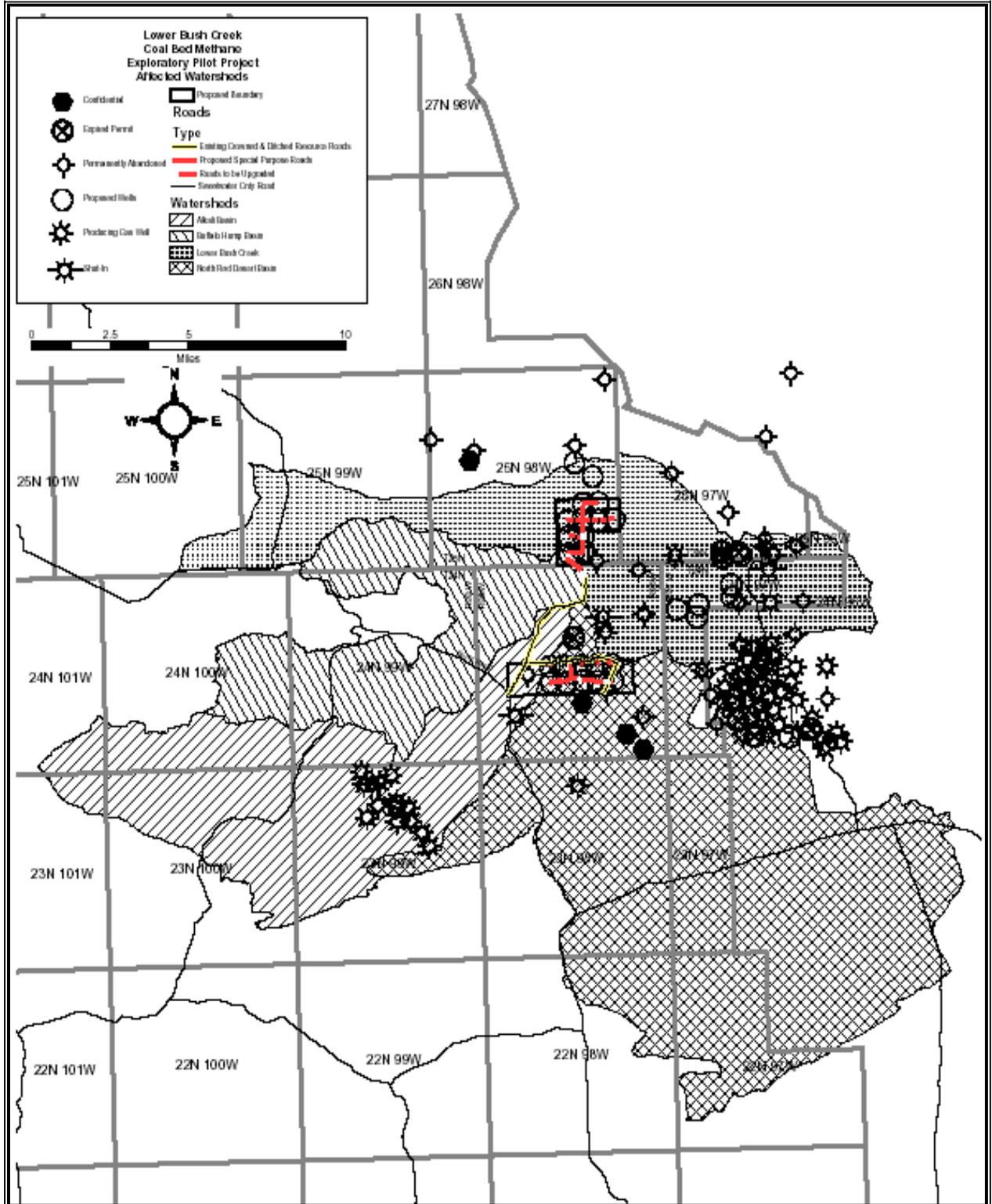
3.5.1 SURFACE WATER

The proposed project is located within the Red Desert watershed. Major water resources in this portion of the basin include the Chain Lakes area and numerous playas that serve as drainage basins for ephemeral drainages. The project area overlaps 4 sixth-order watersheds including Lower Bush Creek, North Red Desert Basin, Alkali Basin, and Buffalo Hump Basin (Figure 3.6). Bush Creek is the major drainage near the project area and is fed by numerous ephemeral drainages. Bush Creek drains into Bush Lake where any water simply evaporates (closed watershed). Water is also available as a point resource in the form of seeps and springs; however, these are rare. No springs or seeps are within the project area or vicinity. Water bodies are dry for much of the year and flow or contain water only during runoff periods. The area has experienced drought over the last several years.

Data regarding quality and quantity of surface water is limited to rare grab samples from water bodies miles outside the project area. However, given the alkaline nature of the surface and subsurface geology and general character of water in the Red Desert Basin, surface waters could be expected to be more alkaline. The volumes of typical flows are unknown, as gaging stations are not sited in this closed basin. According to WDEQ's water quality information on the Red Desert Basin, flow is seasonal primarily in response to snowpack and flows are contained within the basin with no connection to external drainages. The streams tend to have very high TDS (total dissolved solids) and sediment loads. The WDEQ classifies Wyoming streams according to quality and degree of protection. The water bodies within this watershed are categorized as Class 4 waters. Class Four waters have the following characteristic (WDEQ 2000): Those surface waters which are determined to not have the hydrologic or natural water quality potential to support fish and include all intermittent and ephemeral streams.

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Figure 3.6 Affected Watersheds



3.5.2 WATERS OF THE U.S.

Channels that carry surface flows and show signs of active water movement are generally considered “waters of the U.S.” Similarly, all open bodies of water (except ponds and lakes created on upland sites and used exclusively for agricultural and industrial activities or aesthetic amenities) are considered “waters of the U.S.” (EPA, 33 CFR 328.3(a)). The EPA and the Army Corps of Engineers (COE) regulate such areas. COE regulates the placement of dredged and fill material into wetlands and other “waters of the U.S.” as authorized primarily by Section 404 of the Clean Water Act (33 U.S.C. 1344). The term “waters of the U.S.” has been broadly defined by statute, regulation, and judicial interpretation to include all waters that were, are, or could be used in interstate commerce, such as rivers, streams (including ephemeral streams), reservoirs, and lakes, as well as wetlands adjacent to those areas.

The COE has reviewed the scoping notice for the proposed project. Based on the information provided by the COE, it has been determined that any wetlands or other waters in the project area are isolated and are no longer considered to be “waters of the U.S.” under Section 404 of the Clean Water Act (COE March 22, 2002 response to T Deakins/RSFO, re scoping notice for Kennedy Oil Pilot Exploratory Coal Bed Methane Project). “Waters of the U.S.” will not be discussed further in this analysis.

3.5.3 GROUND WATER

The project area is located in the Wyoming Basin groundwater region described by Heath (1984). Groundwater resources include deep and shallow, confined and unconfined aquifers. Site-specific groundwater data for the project area are limited. Existing information comes primarily from the WOGCC oil and gas well records, Wyoming State Engineers Office (WSEO) water-well records, and the U.S. Geological Service (USGS). Groundwater in the Great Divide Basin is generally found confined in sands in formations including the Fort Union and Wasatch. The Kennedy State 1-36 well (Big Red Coal), located in Section 36, T23N, R97W, water quality analysis showed a total dissolved solids of 21,771 ppm. Water quality in the Big Red Coal in the project area is expected to be equally poor. Permitted water wells are primarily related to oil and gas development and a few are permitted for livestock watering and other agricultural uses. Table 3.2 details the permitted wells in and near the project area. Potential groundwater sources are found in Quaternary, Tertiary, and Cretaceous formations. Although wells depths are provided in records, no correlation is made to the formation source for the water.

**TABLE 3.2
GROUND WATER WELLS IN AND AROUND PROJECT AREA**

Permit No.	Priority	Twp	Rng	Sec	Qtr	Qtr	Applicant	Facility Name	Well Depth ^{1/}
P56037W	11-Mar-81	24	98	1	NWNW		USDI BLM	EAST BUFFALO HUMP WELL #4679	550

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Permit No.	Priority	Twp	Rng	Sec	Qtr	Qtr	Applicant	Facility Name	Well Depth ^{1/}
P46103W	07-Dec-78	24	98	6	SWSW		USDI BLM	BAR X ROAD WELL #4510	
P50705W	07-Nov-79	24	98	12	NESW		DAVIS OIL CO.,USDI, BLM	BROWN BUFFALO FEDERAL #1	480
P44489W	20-Jul-78	24	98	14	NWNW		DAVIS OIL CO., USDI, BLM	DAVIS RIGBY ROAD UNIT #1 WATER	
P85368W	12-Jun-91	24	98	16	SWNW		WYO BOARD OF LAND COMMISSIONERS, JIM NEBEKER TRUCKING CO.	NEBEKER #2	
P85367W	12-Jun-91	24	98	16	SESW		WYO BOARD OF LAND COMMISSIONERS, JIM NEBEKER TRUCKING CO.	NEBEKER #1	
P56969W	23-Apr-81	24	98	19	SESW		DAVIS OIL CO., USDI, BLM	LIGHTHOUSE UNIT #1	
P57743W	07-Jul-81	24	98	19	SWSE		DAVIS OIL COMPANY, USDI, BLM	LIGHTHOUSE #1-A	
P51038W	04-Feb-80	24	98	20	SWNE		DAVIS OIL CO., USDI, BLM	BASIN WELL UNIT #1	470
P48529W	12-Jun-79	25	98	1	SWNE		DAVIS OIL CO., USDI, BLM	FIVE FINGERS UNIT #2	200
P42422W	14-Mar-78	25	98	14	SWNE		DAVIS OIL CO., USDI, BLM	DAVIS #1 FIVE FINGERS UNIT WATER	520
P44365W	13-Jul-78	25	98	17	SENW		WOODS PETROLEUM CORPORATION, USDI, BLM	LOST VALLEY UNIT #1	550

^{1/} Information on the depths of some wells were not available.

3.6 VEGETATION, SPECIAL STATUS PLANT SPECIES, WETLANDS, NOXIOUS WEEDS

3.6.1 VEGETATION COVER TYPES

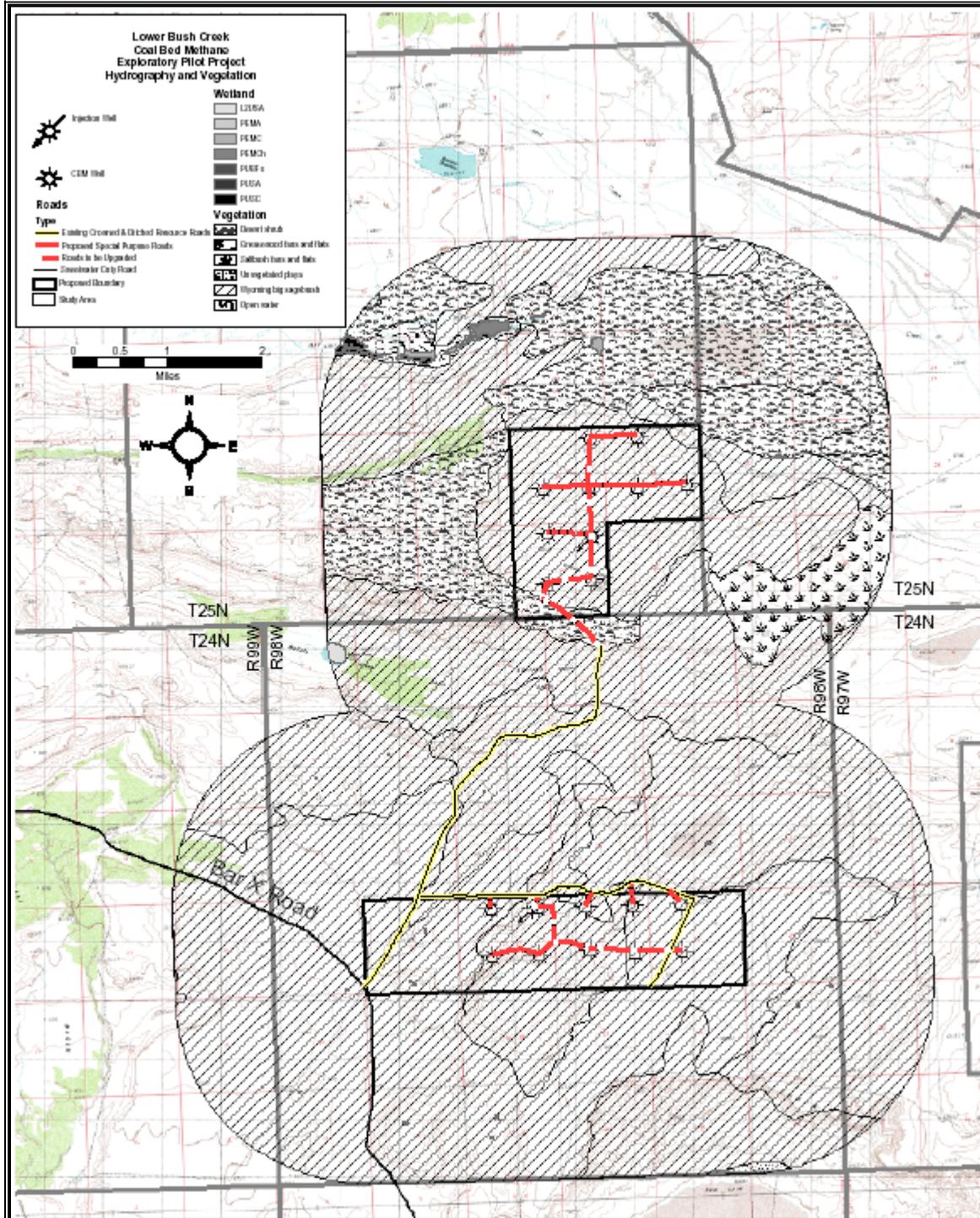
The Great Divide Basin is within the Upper Sonoran zone. Shrubs growing in these areas include saltbush, greasewood, sagebrush, and rabbitbrush. Other common plant species include: gray horsebrush, spiny hopsage, and Indian rice grass. Observed plants in the project area included several species of sagebrush, Mormon tea, rabbitbrush, greasewood, pricklypear cactus, low grasses, upland sedges, and weedy forbs. See Figure 3.7 for land cover of the project area, as available from the USGS National Gap Analysis Program. The GRRMP identifies the vegetation as a mosaic of high and low-density sagebrush communities.

3.6.2 THREATENED AND ENDANGERED PLANT SPECIES

U.S. Fish and Wildlife Service identified two plant species as having potential habitat in the general area. These two species include Ute Ladies'-tresses (*Spiranthes diluvialis*) listed as threatened, and blowout penstemon (*Penstemon haydenii*) listed as endangered. Ute Ladies'-tresses has been found along Platte River drainages below Alcova, Cheyenne, and Niobrara drainages. Blowout penstemon

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Figure 3.7 Riparian, Wetland, and Vegetation Types Found in Project Area and Vicinity



has been found along the Killpecker Sand Dunes near Rawlins. No potential habitat in or within a mile of the project area has been identified during field reviews. Since no potential habitat occurs in or adjacent to the project area, BLM has made a no-effect determination. These species will not be given further consideration in this document.

3.6.3 CANDIDATE AND BLM SENSITIVE PLANT SPECIES

The BLM State Director has designated several plant species found in Sweetwater County as sensitive. Sensitive species with potential for habitat in the project area include large-fruited bladderpod (*Lesquerella macrocarpa*), Nelson's milkvetch (*Astragalus nelsonianus*), and persistent sepal yellowcress (*Rorippa calycina*). A summary of the sensitivity status and rank of the species of concern is found in Appendix B.

The large-fruited bladderpod (*Lesquerella macrocarpa*) is endemic to the western rim of the Red Desert Basin in Fremont and Sweetwater Counties. This species is designated by the BLM as sensitive and was a candidate for federal listing. Other populations have been identified in Lincoln and Sublette counties in high rim and butte topography. Total population size is estimated at approximately 52,000 plants in 1994 covering an area of 2,079 acres (Fertig 1995). Large-fruited bladderpod occurs in gypsum-clay hills and benches, clay flats, and barren hills at elevations between 7,200 and 7,700 feet. This plant is usually absent from rocky soils and areas dominated by sagebrush or high cover of grasses. Nine populations are known in the state of Wyoming. This species does not have potential habitat in the project area. The nearest known population is about 20 miles northwest of the project area.

Nelson's milkvetch (*Astragalus nelsonianus*, syn. *Astragalus pectinatus* var. *platyphyllus*) is also endemic to areas that are alkaline, often seleniferous, clay flats, shale bluffs and gullies, and on pebbly slopes in sparsely vegetated sagebrush and cushion plant communities at elevations of 5,200 to 7,600 feet. Population data are lacking for nearly all occurrences of this species; however, one population observed in 1995 was found to consist of relatively few and widely scattered individuals over approximately 20 acres. The nearest known population is approximately 12 miles outside the project area. The plant is not expected to occur on the project area.

Persistent sepal yellowcress (*Rorippa calycina*), another endemic, is a member of the mustard family (*Brassicaceae*). This species has been documented in south-central Montana, western North Dakota, central Wyoming, and on the arctic coast of Canada's Northwest Territories. The species is found along moist sandy to muddy banks of streams, stock ponds, and reservoirs near the high-water line at 3,660 to 6,800 feet. Populations tend to be found in semi-disturbed openings in small inlets or bays. The nearest known population is over 15 miles to the east. No potential habitat for this plant exists in the project area.

Because these sensitive species or their habitat are not known to occur within the project area or the 2-mile buffer area, these species will not be addressed further in this analysis.

3.6.4 Wetlands

The U.S. Fish and Wildlife Service National Wetland Inventory (NWI) Maps identify two wetland areas within the lease boundaries of the project area. These wetlands are located in the Central Sweetwater pod in Section 20, T. 24 N., R. 98 W., and consist of Palustrine Unconsolidated Bottom Semipermanently Flooded Excavated ponds (PUBFx) and Palustrine Unconsolidated Shore Temporarily Flooded (PUSA) wetlands (see Figure 3.7). The designation and its description are contained in the following list.

Designation	Description
L2USA	- Lacustrine, Littoral, Unconsolidated shore, Temporarily flooded
PEMA	- Pallustrine, Emergent, Temporarily flooded
PEMC	- Pallustrine, Emergent, Seasonally flooded
PEMCh	- Pallustrine, Emergent, Seasonally flooded, Impounded
PUBFx	- Pallustrine, Unconsolidated bottom, Semipermanently flooded, Excavated
PUSA	- Pallustrine, Unconsolidated shore, Temporarily flooded
PUSC	- Pallustrine, Unconsolidated shore, Seasonally Flooded

Given the wetland locations and surface drainage patterns, proposed road and well pad locations should not affect these wetlands. Because these wetlands are not affected and no direct, indirect or cumulative impacts are expected, these wetlands are not discussed further in this analysis.

Site observations reveal that most wetlands are restricted to the margins of John Hay Reservoir, outside the project area. Figure 3.7 shows the NWI for the region surrounding the project area.

3.6.5 NOXIOUS WEEDS/INVASIVE SPECIES

Although the project area is vulnerable to infestations of invasive/noxious weeds as is any area within the RSFO area, infestations of invasive/noxious weeds are relatively minimal within the project area at present. However, any newly disturbed surface would be susceptible to introduction of invasive or noxious weeds. Infestations known north and south of the project area include populations of Black henbane (*Hyoscyamus niger*), Kochia (*Kochia scoparia*), and Halogeton (*Halogeton glomeratus*).

3.7 RANGE RESOURCES AND OTHER LAND USES

The project area is within the Red Desert Allotment (#13012). Grazing management on this allotment has been evaluated by the RSFO as satisfactory, and the overall trend of use and sustainability is static. In 1999 a standards assessment was performed and the public lands within the allotment were found to be in compliance with Wyoming standards for rangeland health. The allotment size is 243,676 acres and has 9,758 active AUMs utilized by sheep and cattle.

Other land uses include the proposed Hay Reservoir 3-D geophysical project (permit under review) and existing rights-of-way (e.g., roads, pipelines) associated with on-going mineral-related activity in

and adjacent to the project area (see Figure 3.3).

3.8 WILDLIFE/SPECIAL STATUS ANIMAL SPECIES

The project area includes sagebrush/saltbush steppe and greasewood wildlife habitats. The Red Desert Basin is within the Upper Sonoran zone. Shrubs growing in these areas include saltbush, greasewood, sagebrush, and rabbitbrush. Other common plant species include gray horsebrush, winterfat, and Indian ricegrass. Observed plants in the project area include Wyoming big sage, spiny hopsage, Gardner saltbush, rabbitbrush, greasewood, pricklypear cactus, grasses, and forbs.

Many species of birds, mammals, amphibians, and reptiles may be found within the Red Desert. The most common large game animals found in the study area today are pronghorn antelope, mule deer, and elk. Other mammals include coyote, fox, skunk, badger, White-tailed prairie dog, Whitetail jackrabbit, and a number of small rodents. The area also contains Greater Sage-grouse. Raptors found in the area include Ferruginous Hawk, Golden Eagle, Prairie Falcon, and Burrowing Owl.

Reptiles found in the study area include Northern sagebrush lizard, Short-horned lizard, and Great Basin gopher snakes. Tiger salamanders and the Leopard frog may be found in the geographic area, but do not occur in the project area. The proposed development is not expected to impact the common species found in the project area; therefore, they are not considered in this analysis. Those species considered in this document include threatened, endangered or proposed for listing status, big game species, raptors, and BLM sensitive species.

Information regarding the occurrence of species included in this analysis was obtained from several sources. Greater Sage-grouse lek locations, seasonal big game range designations, raptor nest locations, and locations for threatened and endangered species were obtained from the Wyoming Game and Fish Department's (WGFD) Wildlife Observation System and BLM GIS database.

3.8.1 BIG GAME

Three big game species, pronghorn antelope (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), and elk (*Cervus elaphus*), occur in the project area during all or parts of the year. Several categories of range use define habitat utilization. Winter ranges are used by substantial numbers of animals only during the winter months (December through April). Winter/year-long ranges are occupied throughout the year, but during winter these ranges are used by additional animals that migrate from other seasonal ranges. Crucial big game range (e.g., crucial winter/year-long range) describes any seasonal range or habitat component that has been documented as a determining factor in a population's ability to maintain itself at a specified level over the long-term. Crucial winter ranges are typically used eight out of 10 winters. No crucial winter range overlaps with the project area.

Pronghorn Antelope

The project area is within the Red Desert Pronghorn Antelope Herd Unit. The Red Desert Herd Unit including WGFD Hunt Areas 60, 61, and 64. The unit area is described as leaving Rawlins,

Wyoming, along I-80 in a westerly direction to Point-of-Rocks, north to Continental Peak, north and east to Baroil, Wyoming, then south along Highway 287 to Rawlins. The herd unit contains 2,165,682 acres of which 272,516 acres are crucial winter range and 1,849,588 acres are winter/yearlong range. For the purpose of this analysis, the portion of the herd unit analyzed is limited to that which overlaps the general cumulative impact assessment area of the Continental Divide/Wamsutter II project encompassing 1,849,024 acres (Figure 3.8). The pods lie within a migration area. No crucial winter range for antelope occurs in the project area or vicinity.

Hunter success rates in the area for 1998 through 2000 averaged 95%. The 2000 hunting season resulted in a harvest of 1,144 animals in the unit. The population objective for the Herd Unit is 12,000 animals. Recent population data are not available; however, the 1992 population was estimated at 12,800. Intervening years have been characterized as drier than average and certainly the past three have brought drought conditions to the area.

Preferred pronghorn habitat may be characterized by sagebrush/rabbit-brush plant communities with an open view. An important factor affecting antelope population is weather. Severe winters with deep, crusted snow, and sub-zero temperatures may result in high mortality. Drought conditions often result in high fawn mortality.

Mule Deer

The project area is within the Steamboat Herd Unit. The herd unit occupies the area between the Green River and the east side of the Great Divide Basin, south of Highway 28, and north of I-80. The herd unit takes in more than 1,273,734 acres of which 144,272 acres are crucial winter range and another 492,822 acres make up winter/yearlong range. For the purpose of this analysis, the portion of the herd unit analyzed is limited to that which overlaps the general cumulative impact assessment area of the CD/WII project encompassing 642,668 acres (Figure 3.9). Habitats range from coniferous forests to desert scrub. The project area lies in seasonal use ranges for mule deer. Refer to the RSFO GIS database and WGFD for details on the seasonal range types and boundaries. Hunter success rates in the area for 1998 through 2000 ranged from 23 to 34 percent and averaged 30%. Overall harvest numbers were variable over those years, ranging from 191 in 1998 to 321 in 1999 to 295 in 2000. The population objective for the herd unit is 4,000. The model estimate for the 1992 population was 3,219.

Elk

The project area is located within the Steamboat Herd Unit (Hunt Area 100, 101, and 109). This herd unit occupies the area north of Rock Springs, Wyoming, east of the Green River, south of Highway 28 and the Sweetwater River, and west of Wamsutter, Wyoming. The herd unit contains well over 2 million acres of which 215,000 acres are crucial winter range. No crucial winter range occurs in the project area. For the purpose of this analysis, the area of the herd unit analyzed is limited to that

Figure 3.8 Antelope Herd Units, CD/WII Cumulative Impact Assessment Area in Relation to the Project Area

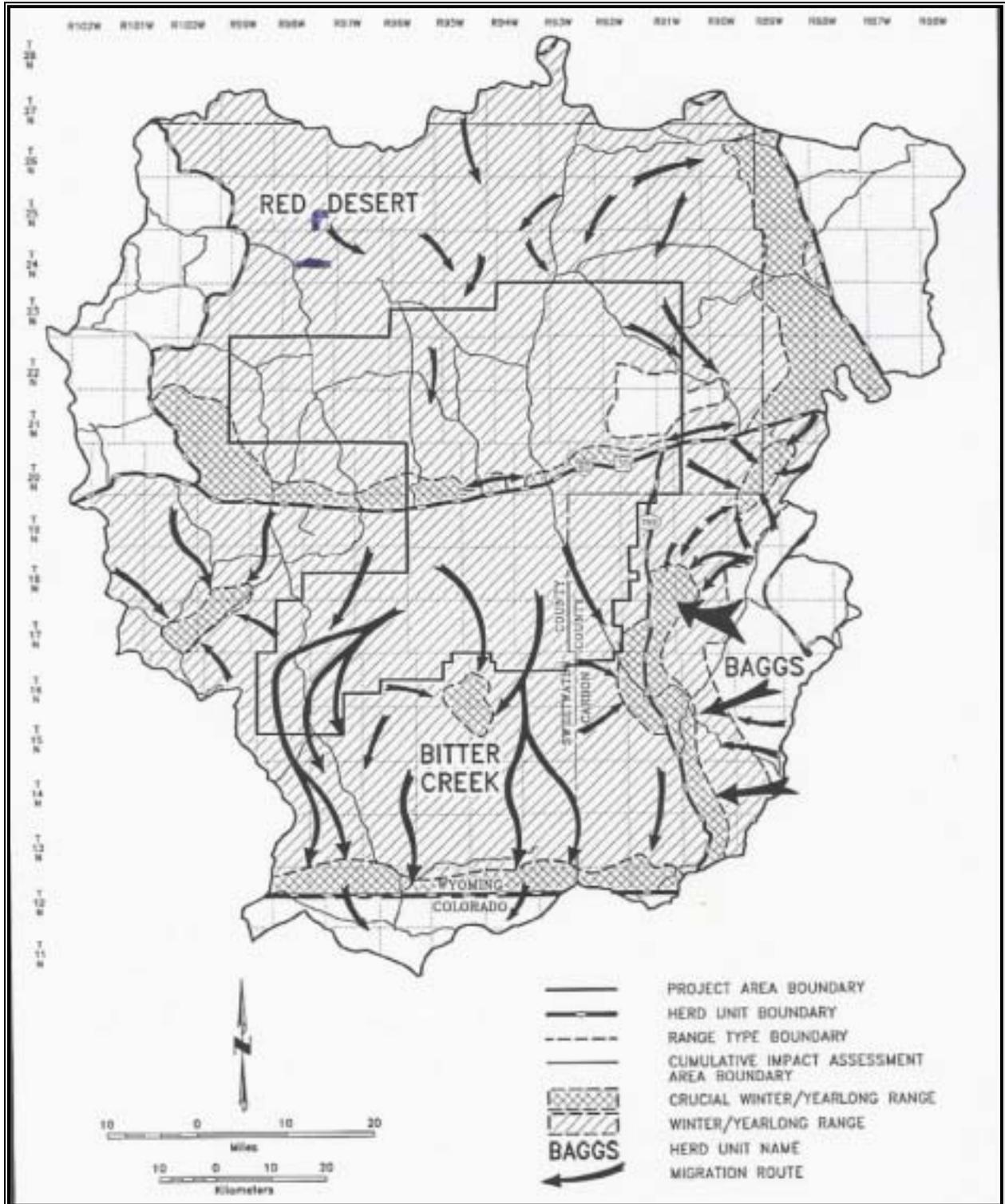
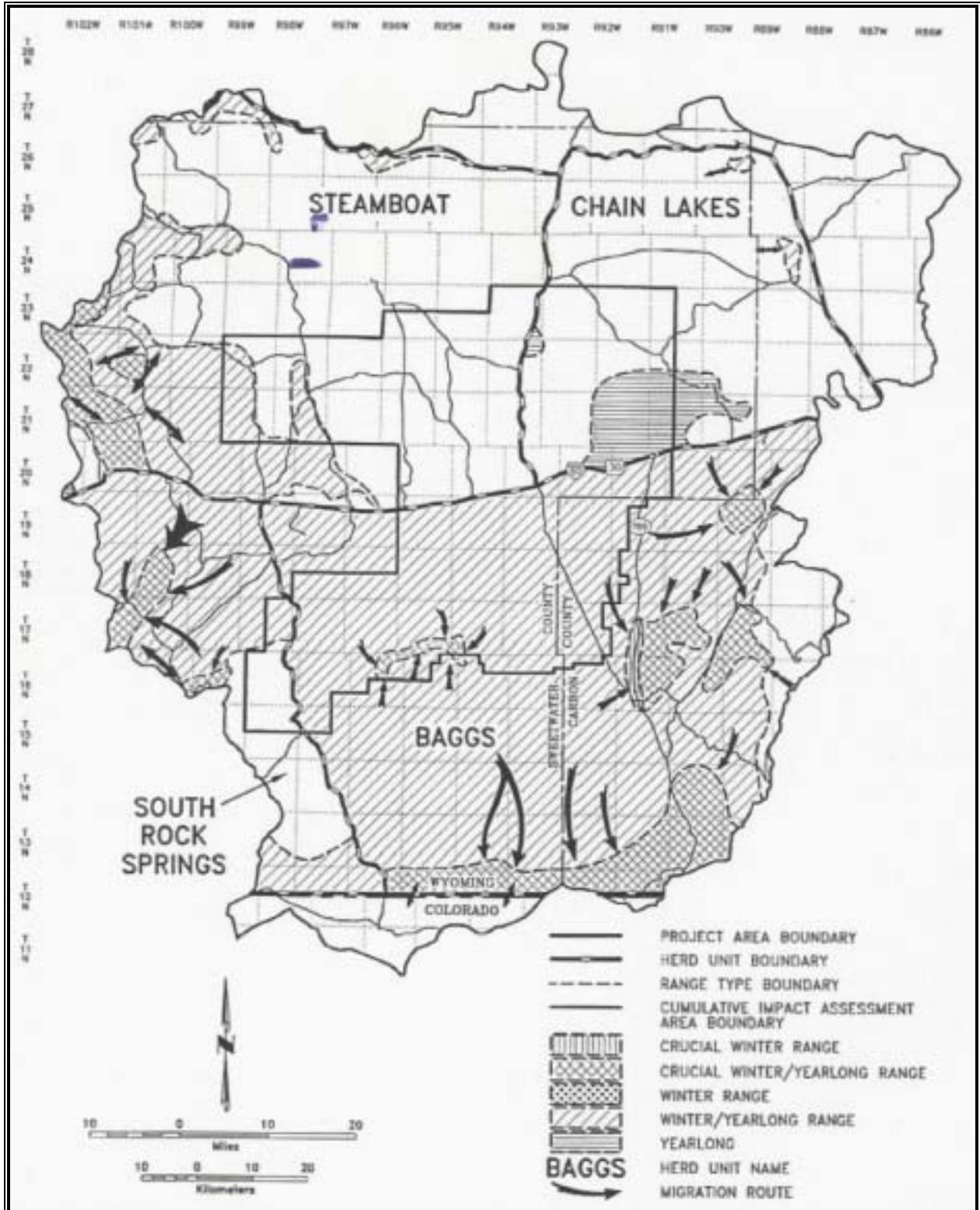


Figure 3.9 Mule Deer Herd Units, CD/WII Cumulative Impact Assessment Area in Relation to the Project Area



which overlaps the general cumulative impact assessment area for the CD/WII project encompassing 715,200 acres (Figure 3.10). The BLM and WGFD, through the University of Wyoming, have been gathering elk movement information for this herd over the past several years. This information should better define seasonal use areas and habitat preferences of this elk population.

The Steamboat elk herd was reestablished through a series of transplants from the Jackson Hole and Yellowstone area beginning in 1944. The population objective was originally established at 500 animals; however, due to an increase in herd unit size and greater population, the herd unit objective was recently increased to 1,200. The Wyoming Game and Fish population data for the year 2000 showed the population to be approximately 1,800 animals. Within the last five or six years, herds of elk are routinely observed in the Buffalo Hump area during all seasons.

3.8.2 UPLAND GAME BIRDS

Greater Sage-Grouse

The greater sage-grouse (*Centrocercus urophasianus*) is an important upland game bird in Wyoming. The project area is within suitable grouse habitat for breeding, nesting, brood-rearing, and winter occupation. According to WGFD and RSFO records, no leks are located within the project area; however, five leks are known within two miles of the project area. See Figure 3.11 for locations of these strutting grounds.

Populations of the species are suspected to have declined in the late 1990's on the Buffalo Hump West lek, in Section 34, T25W R98N; the Buffalo Hump Lake lek in Section 8, T24N, R98W; the Buffalo Hump South lek, in Section 9, T24N, R98W; the Basin Well lek; and the Luman Rim lek, based on field observations by WGFD and BLM biologists. Monitoring by BLM on two of the leks during 2001 and 2002 have shown that one strutting ground appears to be abandoned and the other had only two males on it each year. Dry conditions have been noted as contributing elsewhere to declines in sage-grouse populations. No current population data or estimates are known for sage grouse in the Red Desert Upland Game Management Area (Figure 3.12). WGFD observations in the Bastard Butte (T25N R97W) and Alkali Well (T23N R99W) areas demonstrate a potential trend for populations in the project area. The graph below shows apparent population trends on these two strutting grounds.

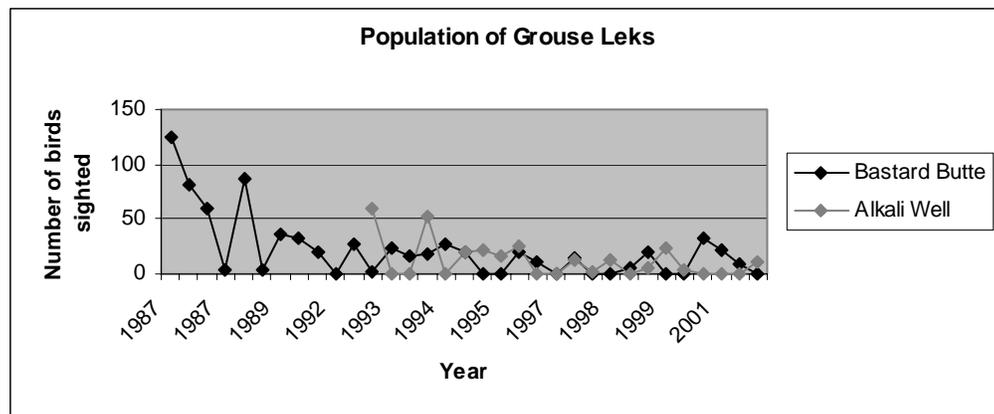
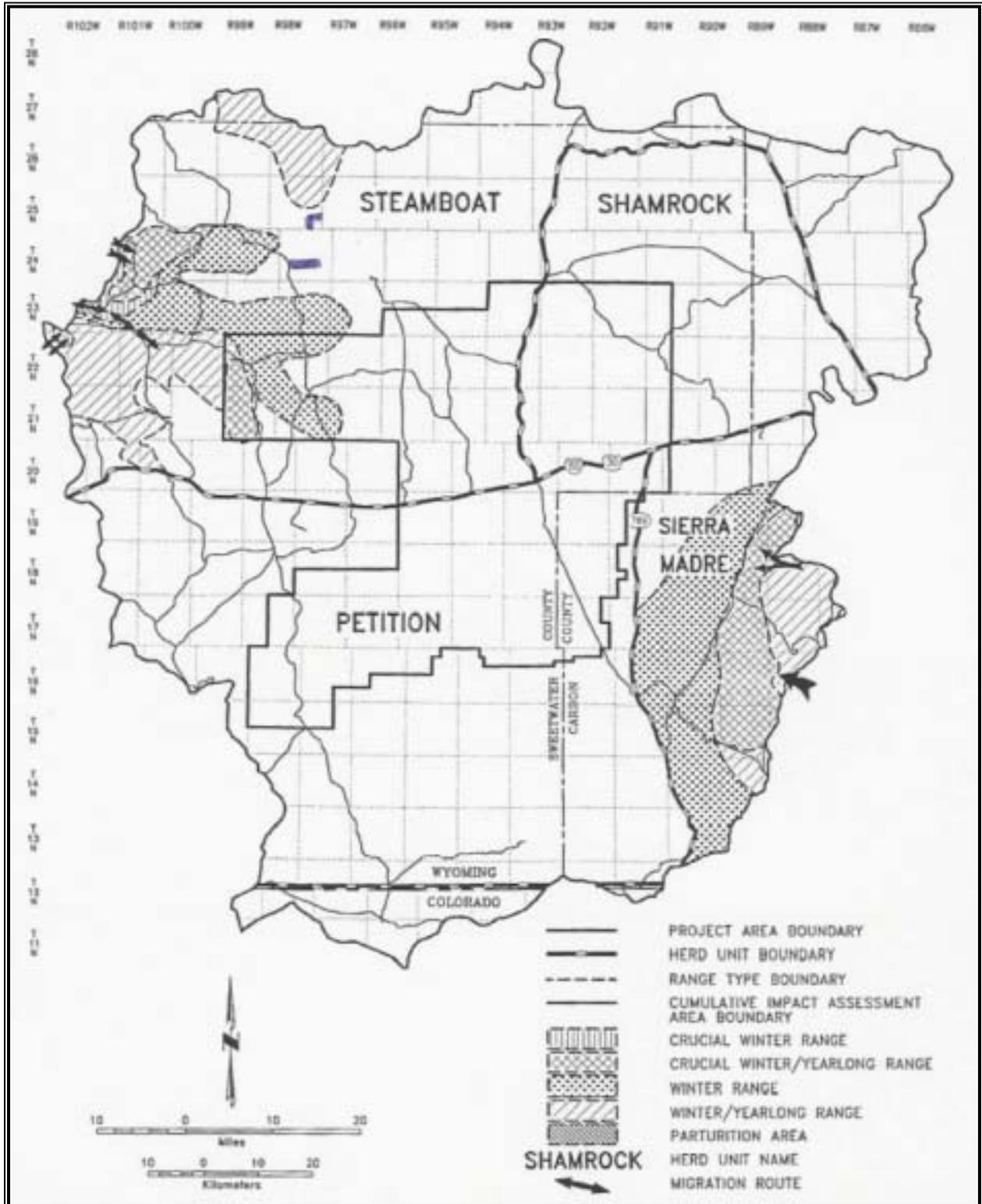
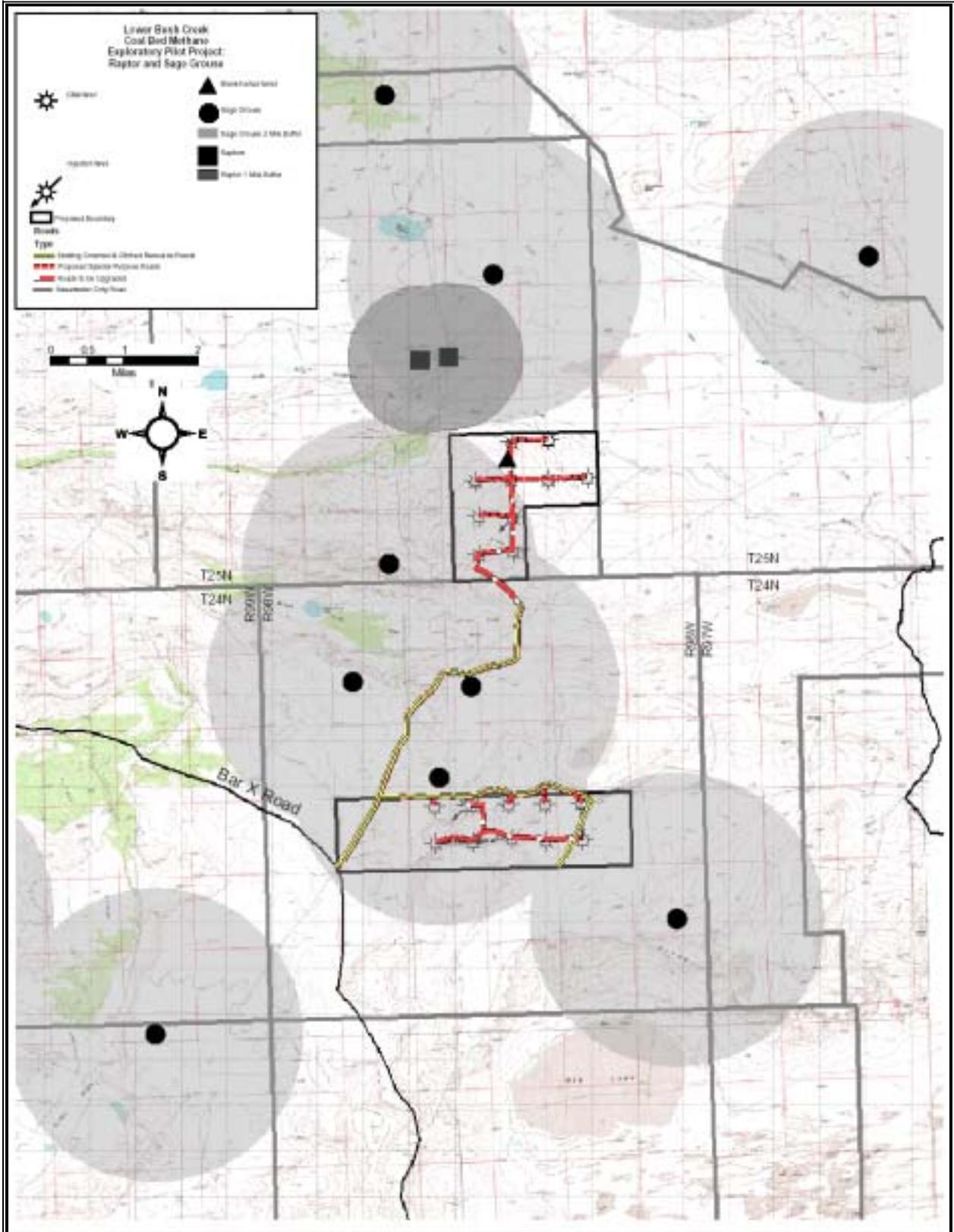


Figure 3.10 Elk Herd Units, CD/WII Cumulative Impact Assessment Area in Relation to the Project Area



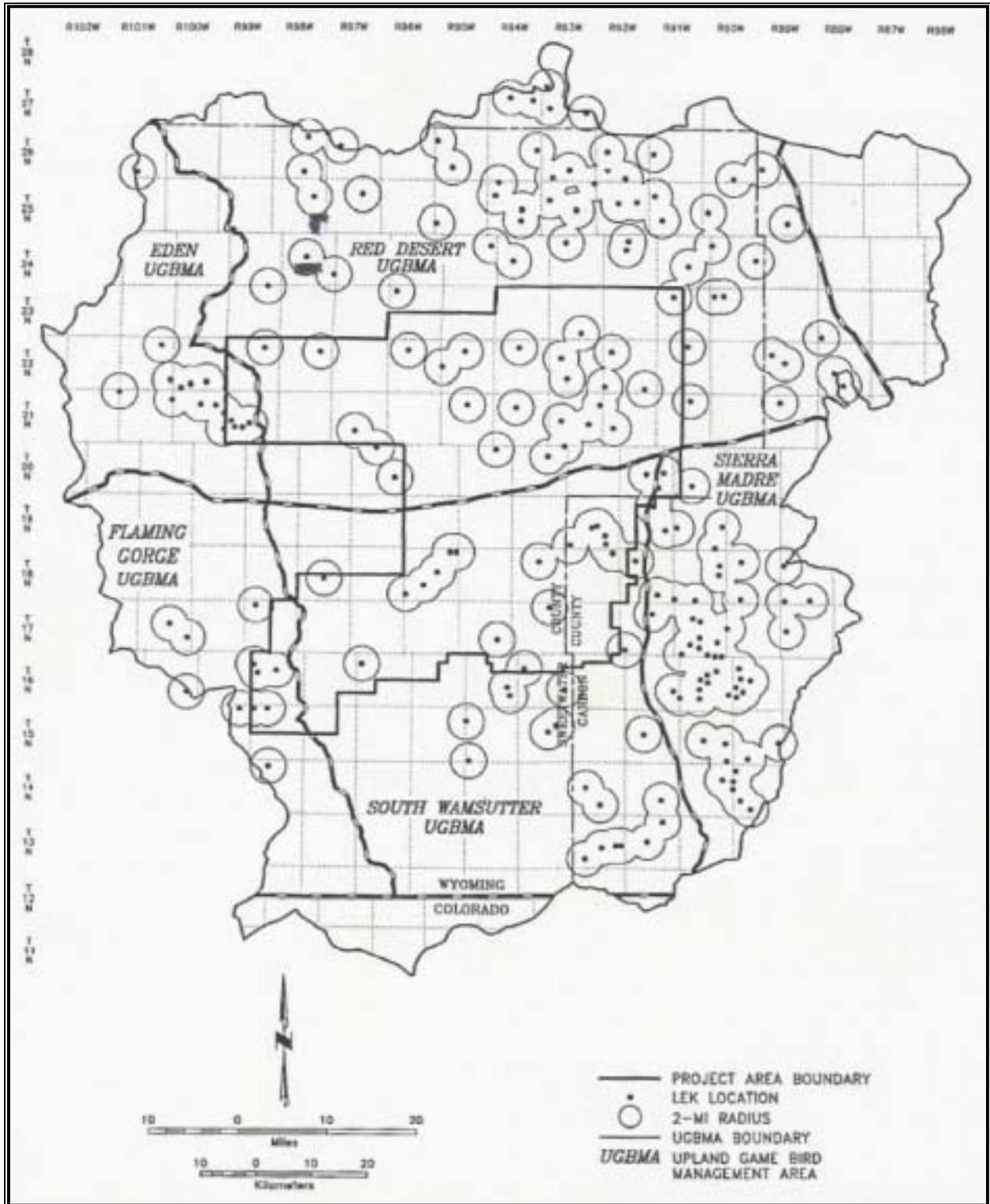
Environmental Assessment, Lower Bush Creek Pilot Exploratory Coal Bed Methane Project

Figure 3.11 Sage Grouse, Raptor Nests in the Vicinity of the Project Area



Environmental Assessment, Lower Bush Creek Pilot Exploratory Coal Bed Methane Project

Figure 3.12 Upland Game Management Areas in CD/WII Cumulative Impact Assessment Area in Relation to the Project



3.8.3 RAPTORS

Several birds-of-prey species occur within or adjacent to the project area. They include the ferruginous hawk (*Buteo regalis*), northern harrier (*Circus cyaneus*), burrowing owl (*Athene cunicularia*), golden eagle (*Aquil cyrysaetos*), and prairie falcon (*Falco mexicanus*). Two ferruginous hawk nests have been documented north of the North Sweetwater Pilot pod, approximately one mile from the northern pod boundary at the John Hay Reservoir (see Figure 3.11). A burrowing owl is also known to nest in a prairie dog colony 3.5 miles northwest of the project.

Observations by BLM biologists in and around the project area during the spring and early summer of 2002 revealed an active ferruginous hawk nest at the John Hay Reservoir but no other nesting raptors were observed.

3.8.4 Threatened and Endangered Species

Black-footed Ferret and Associated White-tailed Prairie Dog Colonies

White-tailed prairie dog (*Cynomys leucurus*) colonies provide habitat for black-footed ferrets (*Mustela nigripes*). One prairie dog colony occupies approximately 20 acres on the north boundary of the Central Sweetwater Pilot pod. Scattered burrows are also found outside this colony. This colony size is not sufficient to support ferrets but the prairie dog complex is large enough and sufficiently populated by prairie dogs to provide suitable habitat for black-footed ferrets.

The North Sweetwater pod falls within or adjacent to a large prairie dog colony and is part of a very large complex. Searches for black-footed ferrets have not been conducted within this complex. The Final EIS for the GRRMP (BLM 1996), Appendix 14-1, Table 2, indicates a confirmed sighting of a black-footed ferret in May 1983 in T. 23 N., R. 98 W. Other probable or positive sightings in the general area occurred in August 1972 in T. 14 N., R. 98 W., and 1969 in T. 18 N., R. 93 W. The Final EIS prepared for the GRRMP indicates that two sightings of ferrets have been recorded in or near the project area, one near Brannan Reservoir and the other near Buffalo Hump. Researchers have concluded, through archaeological and historical evidence, that this species has never been abundant throughout its range.

Mountain Plover

Mountain plover (*Charadrius montanus*) are small birds similar to killdeer that inhabit short-grass prairie and shrub-steppe landscapes. They are also found on cultivated farms, prairie dog towns, and habitats of sparse sagebrush. These birds are ground nesters that prefer nesting habitat characterized by sparse vegetation and/or bare ground with sandy soil. Nest sites in shrub-steppe environments are often located in the area of prairie dog towns. These birds are rarely found near water. Positive indicators for mountain plovers include near-level terrain, prairie dogs, bare ground, cactus, cattle, widely spaced plants, and horned larks. Mountain plovers are seldom found in tall grass or any dense vegetation. Mountain plovers do not appear to be wary of vehicles; therefore, survey work for this species is best done on ATV's or pickup trucks.

No mountain plovers were observed in suitable habitat during general resource surveys in 2002;

however, prairie dog towns and other suitable habitat exist in the project area. The species is expected to use the area for nesting and brood rearing. No surveys have been conducted in the project area in accordance with the USFWS guidelines. However, the entire project area is being considered as suitable mountain plover habitat and mapping to determine prairie dog habitat in the spring of 2003, confirmed that mountain plover are occupying the area. Other mountain plover sightings have been documented approximately three and a half miles east of the project area and recent sightings (Spring 2003) of mountain plover occurred north of the project area.

Whooping Crane

The U.S. Fish and Wildlife Service identified the whooping crane (*Grus americana*) as experimental during public scoping. However, since then, the bird has been declared extirpated from western Wyoming (U.S. Fish and Wildlife Service, pers comm. L.Keith 5/03). Therefore, this species will not be given further consideration in this document.

Bald Eagle

No sightings of the bald eagle (*Haliaeetus leucocephalus*) have been documented in or adjacent to the project area. Bald eagles prefer habitat near water and cliffs or large trees for nesting. No such habitat exists in or near the project area.

Water Depletions to the Platte and Colorado River Systems

The U.S. Fish and Wildlife Service identified certain fish species as potentially affected by water depletions in the Colorado River System including the endangered bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*) and the razorback sucker (*Xyrauchen texanus*). Water depletions occurring in the Platte River system may affect whooping crane, endangered interior least tern (*Steerna antillarum*), threatened piping plover (*Charadrius melodus*), and endangered pallid sturgeon (*Scaphirhynchus albus*), bald eagle, endangered Eskimo curlew (*Numenius borealis*), and the threatened western prairie fringed orchid (*Platanthera praeclara*). The Great Divide Basin is hydrographically closed both as subsurface and surface resources. This project has no potential to affect or impact either river system or special status aquatic species living in them and will not be given further consideration in this document.

3.8.5 BLM SENSITIVE SPECIES

Twelve special-concern species of wildlife occur or potentially occur in the project area. They are the pygmy rabbit, white-tailed prairie dog, swift fox, ferruginous hawk, Greater sage-grouse, burrowing owl, sage thrasher, loggerhead shrike, Brewer's sparrow, sage sparrow, and Great Basin spadefoot toad. Because of changes in censusing techniques, it has been determined that the dwarf shrew (*Sorex nanus*) is not as rare as once believed and has been dropped from the Wyoming BLM Sensitive list and will not be further addressed in this document.

The analysis area contains or has potential habitat for the following species:

Pygmy Rabbit (*Brachylagus idahoensis*) digs its own burrows and is typically distributed in dense

stands of big sagebrush growing in deep loose soils. Such habitat is very limited in the project area. Sightings of the rabbit have occurred just south of Steamboat Mountain located well over 20 miles from the project area. This species is expected to be found in habitats adjacent to but not within the project area.

White-Tailed Prairie Dog is a species which typically lives in towns or colonies established in short grass and sage steppe habitat. This species is present across much of the project area. Refer to the discussion on black-footed ferrets for a discussion of this species.

Swift Fox (*Vulpes velox*) is a housecat size fox usually found in short grass prairie. It prefers to build its dens near ridge tops situated with broad views. Their prey includes ground squirrels, mice, birds, eggs, and a variety of small prey. Swift fox has the potential to occupy the project area.

Ferruginous Hawks (*Buteo regalis*) are raptors found in sagebrush, juniper, and cliff habitats. This species is a common desert dweller which nests on anything from a windmill, juniper tree, barren hilltop, or artificial nest structure. They presently nest on the John Hay Reservoir catwalk north of the project area, on a windmill south of the project area, and on a cliff site southeast of the project area. A one-mile radius from the nest is protected from human activity during the nesting and fledgling rearing season (GRRMP identifies the period between February 1 and July 31). This buffer is established because the nest is usually placed where the bird has a wide vista. In southwestern Wyoming, hatchlings are usually off the nest by the first of July.

Greater Sage-Grouse are a common shrub steppe inhabitant and a popular game species. See Section 3.8.2 for a detailed discussion of this species.

Burrowing Owls (*Athene cunicularia*). Nesting pairs of this species in eastern Wyoming utilized approximately 8.5 acres per pair and are most often associated with prairie dog colonies where they live in abandoned burrows. They are also found nesting in ground squirrel or badger holes and along roadways. Burrowing owls have been sighted within the project area and in suitable habitats outside the area. This species is known to nest in a prairie dog colony south of John Hay Reservoir, a prairie dog colony west of Brannan Reservoir, and in a ground squirrel hole near Chalk Buttes.

Sage Thrashers (*Oreoscoptes montanus*) are common migratory sagebrush obligate passerines. About the size of a robin, this mottled brown bird prefers sagebrush and greasewood communities for nesting and breeding. They commonly feed on seeds and berries, especially buffaloberry, currant, and chokecherry.

Loggerhead Shrike (*Lanius ludovicianus*) are found on the project area from early spring until they migrate south to Mexico and Central America in the fall. This black and white bird is slightly smaller than a robin and is often classified with raptors. Their prey includes songbirds, grasshoppers, crickets, beetles and even small mice. This species often impales their prey on cactus thorns, barbed wire, or greasewood thorns.

Brewer's Sparrow (*Spizella breweri*) and the **Sage Sparrow** (*Amphispiza belli*) are both sagebrush-obligate species and likely occur in the project area. Both nest on or near the ground and feed on seeds and small insects. The Brewer's sparrow is commonly seen in the project area, while the Sage

sparrow is found more often near the John Hay Reservoir.

Great Basin Spadefoot Toad (*Spea intermontana*) is a small toad-like frog that has a spade-like growth on its hind feet to dig a burrow in sand or mud. This family of amphibians is distinguished from true toads by their cat-like eyes and teeth in the upper mouth. Like other amphibians, they must live near a water body, even if the water is seasonal, for successful reproduction. They are commonly found in wetlands associated with flowing wells, along Brannon Reservoir and at the east end of Red Lake. The Great Basin spadefoot toad may occur in playa basins or ephemeral wetlands in the project area following heavy rain.

A summary of the sensitivity status and rank of special status species is found in Appendix B and as an attachment to any permitted component.

3.8.6 MIGRATORY BIRDS

A large number of neotropical and migratory bird species occupy this sagebrush steppe plant community. Birds which typically frequent this area during summer include raven, sage sparrow, horned lark, western bluebird, loggerhead shrike, sage thrasher, McCowen's longspur, and vesper sparrow. Many of the migratory bird species which nest here are common through mid-July, then as this high desert becomes dry and warm, they move north and west to springs, seeps, and more permanent waters, where there is protection from the heat and wind. The slopes of Bush Rim and Joe Hay Rim, located over 12 miles west of the project area, become summer meccas for birds which nest within the Great Divide Basin.

Casual winter species include snow bunting, horned lark, and grey-crowned rosy finch. They may be seen here as winter flocks picking gravel from 2-track trails and roadsides and feeding on plant seed heads which show above the wind-swept snow.

3.9 WILD HORSES

The project area is located within the Great Divide Basin Wild Horse Herd Management Area and encompasses 778,915 acres. The herd management area has an appropriate management level of 415-600 horses with approximately 812 horses currently in the management area. Wild horses are tolerant of human activity. The herd co-exists with current traffic and activity. Wild horses were observed in the vicinity of the project area during 2002 late spring and early summer surveys and observation visits.

3.10 RECREATION

Recreational activities occurring in or near the project area include hunting, off-highway vehicle use, and some camping (generally associated with hunting). No developed recreational sites, facilities, or special recreational management areas exist within or near the project area. The geographic area attracts hunters for big and small game seasons. The area also attracts small numbers of visitors engaged in rock collecting, camping, hiking, wild horse/wildlife observation, outdoor photography,

and picnicking. Although data on recreational use are limited, it is expected that overall use levels are generally low. Trips to the area require long drives from major population centers, and visitation is limited because of the lack of publicized natural attractions and road conditions that limit vehicle access into many back country areas. The GRRMP identifies and manages the area as an extensive recreation management area (not designated as a “special recreation management area”).

3.11 VISUAL RESOURCES

The GRRMP describes and designates scenic quality classifications for the Field Office area, including the project area. The Red Desert is classified as a vast rolling, dry plain with occasional steeper hills and rock outcrops. The project area is typical of the less rugged sections of the Great Divide Basin. The characteristic landscape within the project area and adjacent lands is moderately undulating. Numerous small drainages dissect the landscape. Larger views encompassing several viewsheds are available from high points, taking in vistas of mountain ranges to the north and northwest. The sky/land interface is an important aspect of all distant views. Reddish brown and buff colors of the badland formations add contrast and dominate in areas of steeper topography. Evidence of cultural modification in the project area includes improved and unimproved roads, and oil and gas production facilities.

The project area occurs within a Class III area for visual resource management. Under this classification, changes in the basic elements (form, line, color, or texture) caused by a management activity may be evident in the characteristic landscape. The objective of this class is to provide for management activities that may require modification of the existing character of the landscape. However, changes should remain subordinate to the visual strength of the existing character.

3.12 CULTURAL RESOURCES

Archaeological investigations in the Red Desert Basin indicate the area has been inhabited by prehistoric people for at least 10,000 years from Paleo-Indian occupation to the present. The area was inhabited by small bands of hunters and gatherers for thousands of years. Evidence of these previous inhabitants typically include scattered campsites, occasional burials, occasional house pits, and other sites.

Historic use of the Red Desert Basin typically involves pastoralism and mineral extraction. Inadequate water supply, badlands, and escarpments make the area inhospitable for settlement with only limited ranching activities present. There are numerous features within the present landscape related to both these uses.

Three areas of Native American traditional cultural properties are presently known. Although the Tribal entities did not respond to BLM’s request for public input during scoping, BLM would consult with affected Tribes to elicit concerns and resolve mitigation issues.

Prior to fieldwork, the Wyoming Cultural Records Office will be contacted to request a file search. Cultural resources investigations for the proposed project area included block survey for 20 wells and linear survey of access road/utility corridors for those wells. A total of 468 acres were surveyed

for cultural resources in the initial inventories. There were 10 sites and 10 isolated artifacts located and recorded as a result of this survey. The sites include eight prehistoric sites, one historic site, and one site containing a historic component, prehistoric component, and paleontological materials. The 10 isolated artifacts include two solder dot cans and eight prehistoric artifacts. Additional inventories are anticipated and will change the number of resources identified.

The prehistoric sites consisted of artifact scatters and artifact scatters with features. The recorded sites and isolated finds did not include any diagnostic prehistoric tools. The prehistoric sites probably represent lithic reduction, resource procurement, and habitation areas. The findings of the inventory will serve as a basis for completion of consultations under Section 106 of the National Historic Preservation Act.

Further investigation at some of the sites, in particular 48SW14300, may provide chronological information that would indicate if this site was occupied during the same range of time. It is possible that some of the six sites with prehistoric materials represent task groups, perhaps related to the inhabitants of the Buffalo Hump site that were gathering resources and returning to base camp at Buffalo Hump. Site 48SW14300 is a large prehistoric site with an extensive artifact scatter and features. This may represent another habitation site, similar to Buffalo Hump. Pit structures excavated at Buffalo Hump had a similar morphology to Feature 1 at 48SW14300. Information from this site could provide information to compare and contrast to Buffalo Hump in terms of chronology, technology, and resource use and procurement.

The Buffalo Hump site, 48SW5057, is the largest known archaeological site yet recorded within the Red Desert Basin. The Archaeological Services of Western Wyoming College excavated the site during 1985 and 1986 as part of a data recovery plan designed to mitigate adverse effects from construction of Exxon's Bairoil/Dakota CO2 Pipeline, Section One, from Green River to Jeffrey City, Wyoming (Harrell 1989). A total of 318 square meters (sq. m) was excavated and revealed a multicomponent prehistoric habitation that produced evidence of four occupations spanning the last 2000 years, representing the Late Archaic and Late Prehistoric periods. Evidence from the features and associated cultural remains, indicated that the people who had occupied the camp had a primary focus on collection and processing of plant seeds for food (Harrell 1989). Four housepits, or pit structures, were observed and excavated illuminating the type of shelter or constructions used by the prehistoric inhabitants.

3.13 SOCIOECONOMICS

The geographic area of analysis for potential socioeconomic effects is Sweetwater County and the western portion of Carbon County, Wyoming, and the communities of Rock Springs and Rawlins. Socioeconomic conditions characterized for the assessment include employment and earnings. Sweetwater County has a natural resource-based economy. The oil and gas sector plays an important role. This project would not generate any new employment, but would provide short-term opportunities for existing contractors.

Support for oil and gas development in Sweetwater County is mixed. Nearby residents who are economically tied to the mineral industry generally support development. Opposition comes from

those whose economic interests and lifestyles may be affected, such as grazing allotment permittees and those who value the land for recreation and wildlife habitat purposes and/or believe that certain areas should be left in an undeveloped state.

Executive Order (EO) 12898, "Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations" was published in the Federal Register (59 FR 7629 on February 11, 1994). EO 12898 requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations (defined as those living below the poverty level). The EO makes clear that its provisions apply fully to American Indian populations and Indian tribes, specifically to affects on tribal lands, treaty rights, trust responsibilities, and the health and environment of Indian communities.

Communities within Sweetwater County, entities with interests in the area, and individuals with ties to the area all may have concerns about the presence of CBM development within the project area. Communities potentially impacted by the presence or absence of the proposed development have been identified above in this section. Environmental Justice concerns are usually directly associated with impacts on the natural and physical environment, but these impacts are likely to be interrelated to social and economic impacts as well.

3.14 TRANSPORTATION

The regional transportation system serving the project area is well established and includes Interstate Highway 80, County Road 21 (Bar X Road), and BLM management roads. Improved and unimproved BLM roads also serve local traffic on federal land.

3.15 HEALTH AND SAFETY

Existing health and safety concerns in and adjacent to the project area include occupational hazards associated with CBM exploration and operations; risk associated with vehicular travel on improved and unimproved roads; and low probability events such as landslides, flash floods, and range fires.

3.15.1 OCCUPATIONAL HAZARDS

Two types of workers would be employed by the project: oil and gas workers, who in 1998, had an annual accident rate of 4.0 per 100 workers, and special trade contractors, who had a non-fatal accident rate of 8.9 per 100 workers (U.S. Department of Labor, Bureau of Labor Statistics 1998). These rates compare with an overall private industry average for all occupations of 6.2 per 100 workers.

There has been recent concern among CBM drillers that worker safety standards and training used for conventional oil and gas activities may not be appropriate for the CBM industry (Rock Springs Rocket Miner 2001). During 2000, five workers died and six others were seriously injured in CBM-related accidents in Campbell County, Wyoming. The Wyoming Occupational Safety and Health

Administration, Worker's Safety Division (OSHA) is working with CBM company officials to consider changes in worker safety standards and revised training requirements.

3.15.2 OTHER RISKS AND HAZARDS

Potential for firearm-related accidents would occur primarily during hunting season. No data were available to estimate or discuss likelihood of risk for CBM workers to be injured by hunters. Risk of fire in the project area could occur but is expected to have a low potential. The sagebrush/grass steppe of the project area is subject to a low incidence of lightning strikes, in comparison to the higher incidence of lightning caused fires in the southern area of the RSFO.

3.16 HAZARDOUS MATERIALS

There are no known hazardous waste sites within the analysis area. No hazardous waste or materials are known to be present except those being used for on-going oil and gas activity. Such materials used in association with oil and gas drilling are exempt under Resource Conservation and Recovery Act (RCRA) as long as they are properly handled, stored, and used as intended in accordance with federal and state law.

3.17 NOISE

The project area is located in a sparsely-populated rural setting having modest sound disturbances. The principal sound source within the project area is the wind. Jet aircraft overflights at high altitudes, localized vehicular traffic on county, BLM and two-track roads in the project area and nearby drilling activities also cause sound disturbances within the analysis area. The EPA has established an average 24-hour noise level of 55 dBA as the maximum noise level that does not adversely affect public health and welfare. No regulations concerning quantitative noise levels have been established by the State of Wyoming.