CHAPTER 3: THE AFFECTED ENVIRONMENT

INTRODUCTION

Components of the environment described in this chapter are those that would be affected by one or more of the alternatives. Climate, physiographic provinces, geologic structure, floodplains, threatened and endangered plant species, prime farmlands, wilderness or wilderness study areas, recreation, areas of critical environmental concern, and wild and scenic rivers are not discussed either because they do not occur in the region or because they would not be significantly affected by any of the alternatives.

Certain areas in some Wyoming and Montana tracts have been preliminarily identified as alluvial valley floors (AVFs), and one area in Montana has been definitely identified as an AVF. The possible AVFs have been excluded from consideration for leasing; however, before approval of a mining permit for a tract, the OSM or the appropriate state agency would make a final determination as to their existence and as to whether mining would be permitted in that part of the tract. The location and status of each possible AVF is detailed in appendix C.

GEOLOGY AND MINERALS

Coal

The economic coal beds of the region are found principally in the Tongue River Member of the Paleocene Fort Union Formation and in the Eocene Wasatch Formation. These coal beds generally are 30 to 70 feet thick and cover a wide area (more than 2,700 square miles).

The quality of coal is good, with the Btu content ranging from 8,000 to 9,300 Btus per pound and sulfur content less than 0.5% (see appendix A). Quantities of strippable reserves are estimated to exceed 100 billion tons. The coal seams of greatest significance are the Wyodak, Anderson, Dietz, Knobloch, and Canyon.

Detailed discussions concerning the quality, quantity, correlation, and locations of the coal beds appear in the individual tract profiles, and in *Draft Environmental Statement: Regional Analysis: Northern Powder River Basin Coal, Montana* (USDI, GS & Mont. DSL 1979) and *Final Environmental Statement: Proposed Development of Coal Resources in Eastern Powder River, Wyoming* (USDI, BLM 1979b). This information also is available in *Wyoming Geological Association 28th Annual Field Conference Guidebook* (Glass 1976), *Quality and Reserves of Strippable Coal, Selected Deposits: Southeastern Montana* (Mon, Bur, Mines & Geol. 1973), *Montana Coal: A Guide to Coal Geology, Resources, and Production* (Mont. Bur. Mines & Geol. 1980), and *Geology of the Tongue River Member, Fort Union Formation, Eastern Montana* (Matson and Pinchock 1977).

Coal areas in the Powder River Basin generally have suffered little structural deformation. Significant faults and folds are rare; they are confined mostly to the west flank of the basin along the Big Horn Mountains. This region is classified as aseismic; that is, having no tendency for earthquakes (Simon 1972).

Abundant plant and invertebrate fossils are found in the Tertiary coal-bearing rocks. Vertebrates and other significant fossils are rare; few have been found. The fossils known to be in the region have no exceptional scientific interest or value (USDI, BLM 1979b; USDI, GS & Mont. DSL 1979).

Other Minerals

Other minerals of economic importance in the region are oil and gas, uranium, and bentonite. The primary mineral resource in the region is oil and gas. Oil production in 1980 exceeded 45 million barrels. The uranium industry was very prominent in the southern part of the region before the Three-Mile Island incident. It is now dormant, with most mines closed or producing only small amounts of ore. Bentonite production in the region has declined with the recession and the decline of oil and gas exploration.

Further information is available in the publications cited under "Coal," above.

SOILS AND RECLAMATION

Soils in the region can be grouped into three general types. The first, and most extensive, are the recent soils, which are classified in the Entisol soil order. They occur mostly on sloping topography where geologic erosion is too high to

permit profile development or accumulation of organic matter. The physical and chemical properties of these soils are reliant upon those of the parent materials from which they are derived. These soils are relatively low in plant nutrients and commonly have textures that are too high in clay to be highly suitable for reclamation.

The region also has extensive areas of upland soils on flatter, more stable topography. They are classified in the Aridisol soil order. They commonly have low to moderate accumulations of organic matter and plant nutrients in the surface layer. They also have moderate to strong structural development within the solum (topsoil, subsoil, and soil-like parent material), which is important for good moisture intake and gas exchange within the soil. Stronger profile development also means that carbonates and salts present in the parent material have been leached by water to depths of 1 or 2 feet, or more. This produces a more fertile rooting zone. These soils are the most extensive (in terms of acreage) source of surface material suitable for plant growth when the textures are loamy; that is, not too clayey or sandy. Clayey soils tend to be impermeable to water and therefore droughty. Aridisols are less suitable than mollisols for surface reclamation.

The third major soil type is the Mollisols, which are the most fertile upland soils. These soils are of minor extent in the Wyoming part of the region, but they comprise significant acreage in Montana. They have surface layers high in organic matter and nutrients, and they are the best source of surface soil for rehabilitating the disturbed landscape.

There are minor amounts of fluvial soil types, which are found in flat to gently sloping drainage bottoms. Fluvial soils vary considerably in fertility, depending on the source of the alluvium; however, where salt concentrations are low these soils tend to be very fertile and are the most productive in the region. Riparian areas associated with these soils are especially important because they are a crucial source of biological diversity.

Riparian areas with their specific soils are scarce in the Powder River Region (USDI, GS & Mont. DSL 1979). Minor amounts of other soils are found in the region, including soils with some profile development that are found mainly in recent alluvial landscapes. The fertility of these soils is similar to that of the Entisols.

Detailed descriptions of the soils by tract are included in the individual tract profiles for the Montana tracts. Soil information for the Montana tracts in Big Horn County has a high reliability, since it comes from an Order II soil survey by the Soil Conservation Service, U.S. Department of Agriculture (SCS). According to the Miles City District of the BLM, the soil information for tracts in Powder River County is estimated to have a 30% reliability. A new survey publication for this county is planned.

Soil information for the Wyoming tracts is based on the *Wyoming General Soil Map* (U. of Wy. Ag. Exp. Sta. 1977). This map consists of large delineations of soil associations, some larger than the tracts themselves, so there is no way to determine from the map what percentage of each component is present in a tract or whether any given component occurs within the tract. Therefore, the *General Soil Map* has no utility for making predictions about the fertility of the soils on the Wyoming tracts or their reclamation potential. More site-specific information on soils may be available for Wyoming tracts in the near future.

Reclamation efforts at mines in the region indicate that most soils in the region have a fairly good reclamation potential. "Fairly good" means that these soils rate 7 on a scale of 1 to 10. Reclamation potential is assessed further in the individual tract profiles, in a Forest Service publication (USDA, FS 1974b), and in table 4-1 in chapter 4.

VEGETATION

The major vegetation type in the Wyoming part of the region is the sagebrush-herbaceous, which may also be called sagebrush-grassland. Sagebrush cover of this type generally varies from 20% to 60%. The major grasses are western wheatgrass, needle-and-thread grass, bluegrass, and prairie junegrass. Also of major extent in the Wyoming part of the region is the grassland-mixed shrub type, in which the major overstory species are snowberry, skunkbush sumac, wild currant, and big sagebrush. The major understory species are bluebunch wheatgrass, little bluestem, and Indian ricegrass. The Eastern Powder River coal EIS (USDI, BLM 1979b) contains a more detailed description of the major vegetative types in the Wyoming portion of the Powder River Coal Region.

There are lesser acreages of the juniper-mixed shrub type, in which the major species are Rocky Mountain juniper, big sagebrush, skunkbush sumac, snowberry, and bluebunch wheatgrass. The riparian type, although it constitutes only a small percentage of the total acreage, is of major importance for wildlife habitat. The major species in this type are cottonwood, boxelder, willow, big

sagebrush, western wheatgrass, and bluegrass. More detailed descriptions of the vegetation are included in the individual tract profiles.

The major vegetation types in Montana are the ponderosa pine-grass type, the sagebrush-grass type, the native grassland, and the riparian type. The ponderosa pine type generally is found on shallow, rocky soils. Sagebrush-grass and native grassland types are found on sites that vary from steep slopes to flat areas and have sandy to clayey texture. The fertility of the soils on these sites also can vary considerably. The riparian type, which is found in flat drainage bottoms, produces the most vegetation, but it accounts for only a small part of the total acreage. The 1979 Northern Powder River EIS (USDI, GS & Mont. DSL 1979) contains a more detailed description of the major vegetation types. Table 3A shows the acreage of vegetation types in the coal tracts proposed for leasing.

WATER RESOURCES

Surface Water

The region is drained to the north by Rosebud Creek, the Tongue River, and the Powder River and to the east by the Belle Fourche and Cheyenne rivers. Tributaries of these streams are generally ephemeral or intermittent.

There are two peak runoff periods during the year, corresponding to late winter snowmelt and spring rainfall. The lowest streamflow occurs from October through January. The streamflow regime is modified by numerous small reservoirs (mostly less than 20 acre-feet) and spreader systems. These structures result in appreciable depletion of runoff through increased seepage and evapotranspiration. Very high peak flows (floods with a return interval of 50 years or more) are not noticeably reduced by these structures (USDI, BLM 1979b).

Yields from the nonmountainous drainage basins (the Belle Fourche, Cheyenne, and south and east parts of the Powder River watershed) are generally less than 0.05 cubic feet per second per square mile (cfsm). Streams draining the Big Horn Mountains in the western part of the area generally yield more than 0.3 cfsm (USDI, GS 1973). Volumes of runoff vary considerably from year to year.

Erosion is quite high during peak flows in the ephemeral streams of the region. Sediment yields typically range from 0.13 to 1.3 acre-feet per

TABLE 3A
ACREAGE OF VEGETATIVE TYPES IN COAL LEASE AREA
BY ALTERNATIVE

Alternative	Total	Sage/Grass	Grassland	Ponderosa Pine	Other[a]
1	293,900	(data breakdown is not available for baseline acreage)			
2	14,128	8,626	3,670	0	1,832
3	26,888	10,436	7,729	2,788	5,935
4	40,445	20,613	9,008	3,292	7,532
5	60,234	34,825	12,398	3,482	9,529
6	87,064	50,905	19,806	3,482	12,871

NOTE: This table lists only the acreage of vegetative types on the proposed coal tracts. Off-site acreage is shown in table 2-3.

a. One or more of the following types: saline upland, saline lowland, mixed shrub-herbaceous, riparian deciduous.

square mile per year (USDI, BLM 1979b).

The chemical quality of water in the streams of the region changes continually with varying amounts and sources of water. In streams in the central and eastern parts of the Powder River basin, calcium, sodium, and sulfate are the dominant ions. TDS concentrations frequently are higher than 2,000 mg/l. Streams originating in the Big Horn Mountains, including the Tongue River and Rosebud Creek, typically have much better water quality. Water generally is of the calcium-bicarbonate type, and TDS concentrations often are less than 500 mg/l.

The largest use of surface water is for irrigation along stream valleys. Because stream discharge is small during the irrigation season, small reservoirs are often used for storage of irrigation supplies. Perennial streams and small reservoirs are also important sources of livestock water. Surface waters are used as municipal supplies for Sheridan, Buffalo, Dayton, Ranchester and Kaycee.

Groundwater

Aquifers in the Powder River Basin are contained in formations with a total thickness of more than 9,000 feet. The deepest aquifer of major importance is the Madison aquifer, which is found in the Big Horn Dolomite and Madison Limestone. These formations consist of dense Mississippian carbonate with low primary permeability. High secondary permeability exists locally in areas where there has been fracturing or solution. Yields of more than 1,000 gallons per minute (gpm) are possible where cavernous or fractured zones are present. Transmissivities are typically from 0.010 to 0.025 square feet per day. Recharge into the Madison occurs in the Big Horn Mountains, the Black Hills, the north end of the Laramie Mountains, and the Hartville Uplift. TDS concentrations usually are less than 1,000 mg/l. The major ions are calcium, magnesium, carbonate, and sulfate. The best quality water is found near outcrop areas, where TDS is typically less than 300 mg/l and sulfate less than 10 mg/l.

Most wells in the Madison aquifer are near outcrop areas. In the Black Hills, production exceeds 10,000 acre-feet per year. Bell Creek, Montana, Osage and Newcastle, Wyoming, and Edgemont, South Dakota, obtain water from Madison wells. Douglas, Wyoming, obtains Madison water from a spring. In the Midwest oil fields in Wyoming, wells about 5,000 feet deep supply water for water-flood secondary recovery operations.

The shallow aquifers are separated from the underlying Madison group by a sequence of Cretaceous shales up to 5,500 feet thick.

The Fox Hills-Lance aquifer (referred to as the Lower Hell Creek-Fox Hills in Montana) underlies the strippable coal in much of theregion. It is nearest the surface and most continuous in the northern part of the Powder River basin. The aquifer consists of Upper Cretaceous sands interbedded with sandy shale and claystone. The thickness of water-bearing zones ranges up to about 750 feet. Yields of 100 to 200 gpm are possible in the northern part of the basin. TDS concentrations range from 200 to 2,000 mg/l. No dominant water type is prevalent (Koch et al. 1982).

The Tullock aquifer consists of a section of the Tullock Member of the Fort Union Formation up to 600 feet thick plus the upper 10 to 80 feet of the Lance Formation. It is fine-grained sand, jointed coal, and clinker interbedded with shale. Yields are typically 15 to 40 gpm.

The Lebo Shale overlies the Tullock member and separates it from the Tongue River Member of the Fort Union Formation. In the Tongue River Member, thick coals and thick sandstone lenses beneath the coals are the principal water producers.

The Wasatch Formation, which overlies the Fort Union Formation, yields water sufficient for livestock consumption and domestic purposes from wells completed in lenticular sandstones, and to a lesser extent in jointed coal and clinker beds. Wells in the northern part of the basin may produce 10 to 50 gpm; wells in the southern part produce more. TDS concentrations range from 200 to 8,000 mg/l, but typically they are from 500 to 1,500 mg/l. Better quality water is found in the southern part of the basin. Sodium sulfate and sodium bicarbonate are the dominant water types.

Recharge to the shallow aquifer system is mainly in upland areas through sandy zones of the Fort Union Formation, coarse-grained alluvium, and clinker.

Quaternary alluvium contains the shallowest aquifers in unconsolidated silt, sand, and gravel deposits underlying floodplains and alluvial terraces. The thickness of the alluvial deposits is generally less than 50 feet, but it may be more than 100 feet in some valleys near mountains.

Yields range from a few gallons per minute to several hundred gpm in coarse-grained material along perennial rivers. TDS concentrations range from about 100 to more than 4,000 mg/l, but typically they are between 500 and 1,500 mg/l. Water in alluvium near the Big Horn Mountains and the Black Hills is usually better than that in the central part of the basin. No dominant water type is prevalent.

LAND USE

Agriculture is the primary land use in the region, occupying 87% of the land (Mont. Crop & Lvst. 1980; Wyo. Crop & Lvst. 1981). Most of the agricultural land is used for cattle and sheep. Most farming is dryland production of grain or hay. There is some flood-irrigated farming along stream bottoms.

There are no prime farmlands or wetlands in the region (USDA, SCS 1981). Land uses related to energy development accounted for 23,500 acres in the Montana portion of this region and 76,500 acres in the Wyoming portion of the region in 1980.

Land use in the region has previously been described in the 1979 Northern Powder River EIS, the 1979 Eastern Powder River EIS, and the 1981 Wyoming Coal EIS (USDI, GS & Mont. DSL 1979; USDI, BLM 1979b, 1981b). Refer to table 2-3 and the individual tract profiles for tabulations of affected land by type.

WILDLIFE

Wyoming

The area in the Powder River Basin most affected by coal mining is the Highlight antelope herd unit (hunt areas 24 and 101). Most of the factors that affect this herd unit remain unchanged from those described in the final coal EIS prepared in 1981 (USDI, BLM 1981b). Table 3-1 shows the harvest figures for recent years in antelope and mule deer hunt areas. Table 3-2 shows the acreage that probably would be disturbed by coal mining projects underway or planned. The antelope hunt district/area map shows the locations of hunt areas.

The antelope population in the Highlight herd unit has greatly increased since 1980 to its present level of approximately 12,800 animals, or 10.9 per square mile. Three main factors have contributed to this population explosion: First, all of Campbell County is a favored area for out-of-state hunters; however, the nonresident hunting license fee was drastically increased in 1980, and the number of licenses sold since then has declined sharply. Second, high trespass fees charged for hunting on private land also have discouraged hunters who have already paid a substantial sum for a hunting license. Third, three consecutive mild winters have greatly reduced antelope deaths from winter stress. In addition to these factors, most land that is now leased for coal development—about 7.6% of this herd unit—is closed to sport hunting.

There currently are two mines in antelope hunt area 17 (Gillette herd unit). There is some seasonal movement of antelope in the portion of the herd unit north of Spotted Horse west to the Powder River. A large portion of this herd moves southeast in the late fall into the sagebrush grasslands between Rawhide Creek on the south and Horse Creek on the north. Antelope are common only in the benches and bottomlands along Wild Horse Creek.

Investigations conducted by the Wyoming Game and Fish Department in northern Campbell County showed no significant winter mule deer concentration areas in deer hunt areas 17 and 18. High use areas are described in the 1981 Coal EIS (USDI, BLM 1981b).

Sage grouse are the most common upland game bird in Campbell County, where 51 leks are known to exist. Sixteen of these leks are in the area southeast of Gillette (antelope hunt areas 24 and 101). Five leks have been abandoned and two others destroyed by coal mining activities since 1975 (Wyo. Game & Fish 1979). These are active sage grouse leks on the Mount Logan and Hay Creek tracts.

Sharp-tailed grouse are common in the northern half of Campbell County, with eight leks known. Data are not available for the rest of the county.

There are several migratory bird species of high federal interest in the Powder River Region. These species receive special attention under federal coal leasing regulations. The species in the Wyoming part of the region most likely to be affected by development are golden eagle, prairie falcon, ferruginous hawk, merlin, burrowing owl, mountain plover, and Lewis' woodpecker. Less likely to occur in the Wyoming portion are the

TABLE 3-1
ANTELOPE AND DEER HARVEST IN WYOMING

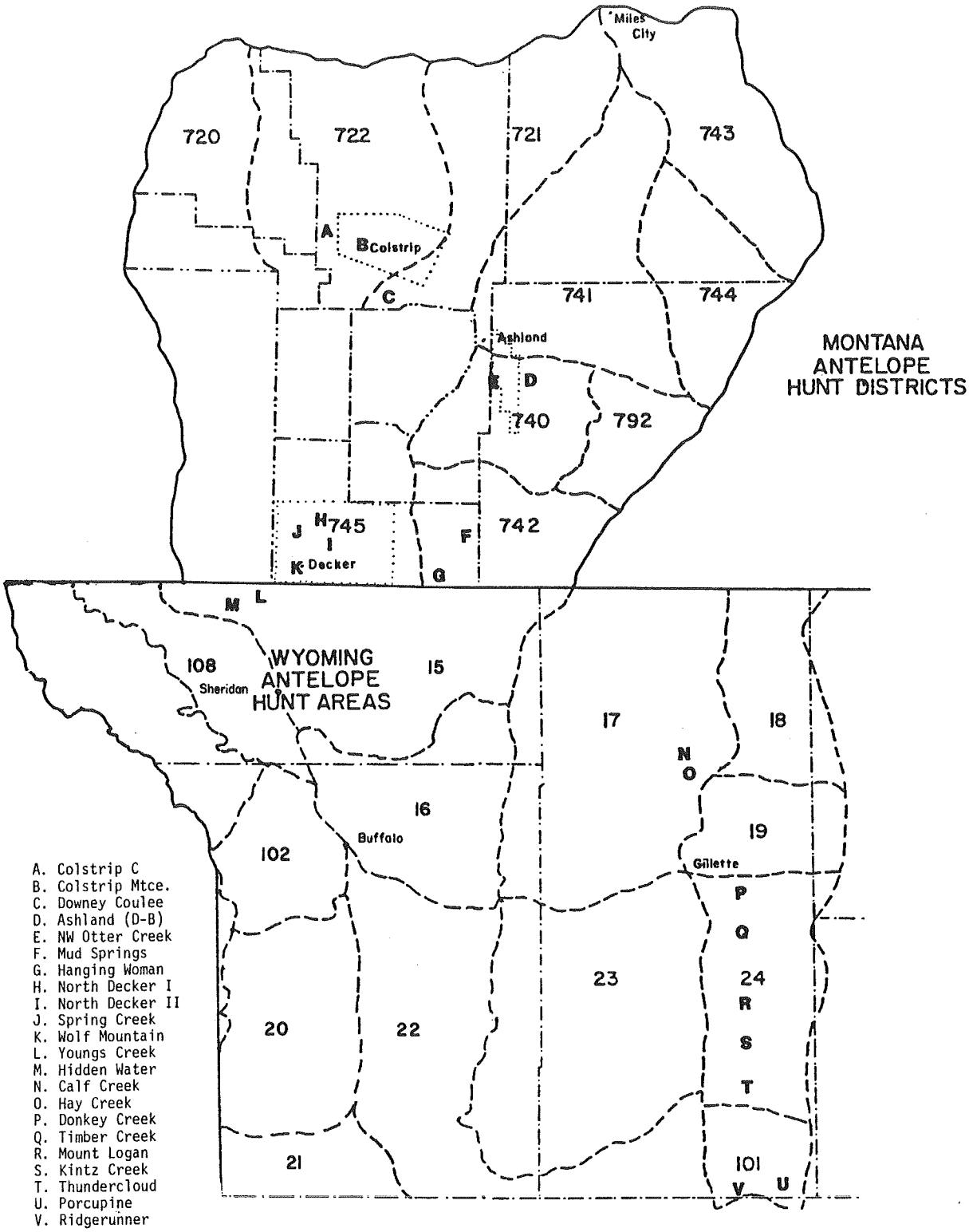
Year	Harvest and Percentage of Change from Previous Year					
	Antelope Hunt Area			Mule Deer Hunt Area		
	24[a]	17	15	21	18	24
1976	2,545	2,983	562	878	2,178	714
1977	1,937 - 23.9%	1,176 - 43.5%	515 - 8.4%	736 - 16.2%	1,876 - 13.9%	1,654 + 131.6%
1978	1,893 - 2.37%	1,627 - 5.2%	575 + 11.6%	498 - 22.3%	1,069 - 43.1%	1,008 - 39.1%
1979	1,226 - 35.3%	1,071 - 34.2%	610 + 6.1%	316 - 36.6%	749 - 30.0%	1,007 0
1980	501 - 59.2%	470 - 56.2%	516 - 15.5%	361 + 14.2%	1,017 + 35.8%	984 - 2.3%
1981	887 + 77.0%	638 + 35.7%	832 + 61.2%	414 + 14.7%	897 - 11.8%	1,180 + 19.9%
1982	1,244 + 40.2%	815 + 27.7%	532 - 36.1%	409 - 1.2%	1,301 + 45.0%	1,363 + 15.5%

a. Area 24 was divided into areas 24 and 101 in 1979. The figures given here for area 24 for 1979 through 1982 are the combined figures for both areas.

TABLE 3-2
ACREAGE DISTURBED BY COAL MINING IN HUNT AREAS

	1983		1985		1990		1995	
Antelope Hunt Area	Acreage Disturbed	Percentage of Herd Unit	Acreage Disturbed	Percentage of Herd Unit	Acreage Disturbed	Percentage of Herd Unit	Acreage Disturbed	Percentage of Herd Unit
24[a]	8,933	1.2%	12,333	1.6%	22,444	3.0%	31,946	4.2%
17	3,142	0.3%	4,264	0.4%	10,152	0.9%	23,297	2.1%
15	746	0.1%	822	0.1%	2,572	0.3%	8,512	1.1%
Mule Deer Hunt Area	Acreage Disturbed	Percentage of Hunt Area	Acreage Disturbed	Percentage of Hunt Area	Acreage Disturbed	Percentage of Hunt Area	Acreage Disturbed	Percentage of Hunt Area
21	8,933	1.2%	12,333	1.6%	22,444	3.0%	31,946	4.2%
18	3,142	0.3%	4,264	0.4%	8,394	0.8%	13,767	1.4%
24	746	0.2%	822	0.2%	1,440	0.4%	2,184	0.6%
17	-0-	-0-	-0-	-0-	1,758	0.2%	9,530	1.2%

a. Area 24 includes area 101. Both make up the Highlight Herd Unit.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ANTELOPE
HUNT DISTRICTS
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722
721
743
A
B Colstrip
C
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Ashland
E
D
740
792
J
H
745
I
K Decker
F
742
G
WYOMING
ANTELOPE
HUNT AREAS
M
L
108
Sheridan
15
17
18
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16
Buffalo
102
19
Gillette
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Q
23
24
R
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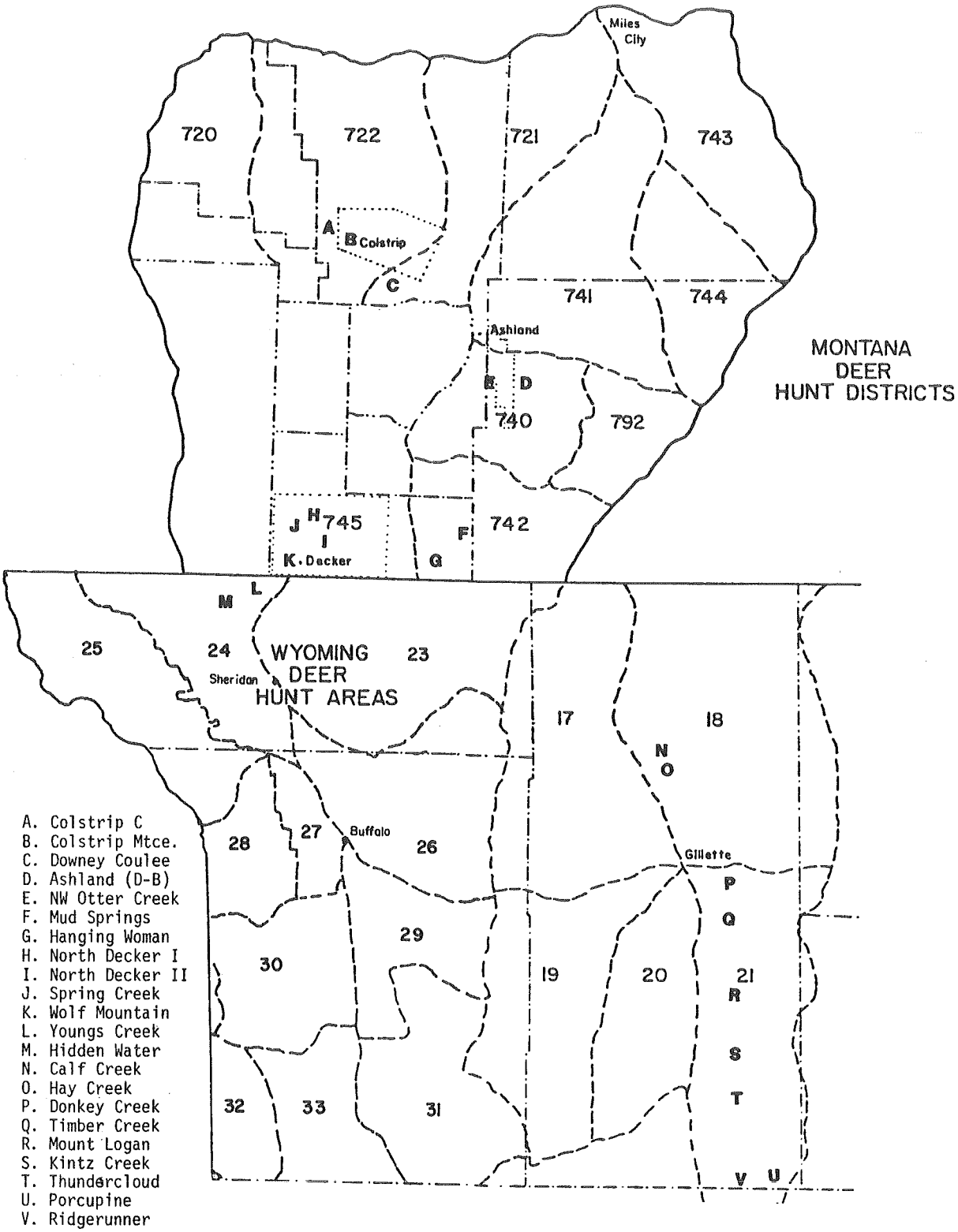
21
101
V
U
A. Colstrip C
B. Colstrip Mtce.
C. Downey Coulee
D. Ashland (D-B)
E. NW Otter Creek
F. Mud Springs
G. Hanging Woman
H. North Decker I
I. North Decker II
J. Spring Creek
K. Wolf Mountain
L. Youngs Creek
M. Hidden Water
N. Calf Creek
O. Hay Creek
P. Donkey Creek
Q. Timber Creek
R. Mount Logan
S. Kintz Creek
T. Thundercloud
U. Porcupine
V. Ridgerunner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A. Colstrip C
B. Colstrip Mtce.
C. Downey Coulee
D. Ashland (D-B)
E. NW Otter Creek
F. Mud Springs
G. Hanging Woman
H. North Decker I
I. North Decker II
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N. Calf Creek
O. Hay Creek
P. Donkey Creek
Q. Timber Creek
R. Mount Logan
S. Kintz Creek
T. Thundercloud
U. Porcupine
V. Ridgerunner

dickcissel and the long-billed curlew.

Golden eagles, red-tailed hawks, ferruginous hawks, and great horned owls are the most common raptors that nest in Campbell County. Available data indicate that there are at least 155 pairs of nesting golden eagles, 21 pairs of red-tailed hawks, 21 pairs of great horned owls, and 79 pairs of ferruginous hawks. There are 13 pairs of golden eagles nesting on or within ½ mile of active mines or areas leased for further development. One pair of prairie falcons nests on the Youngs Creek tract.

The bald eagle, the peregrine falcon, and the black-footed ferret are listed as endangered species by the Fish and Wildlife Service, U. S. Department of the Interior (USFWS). The bald eagle is a common winter resident of Campbell County. The peregrine falcon is a migrant through the region in spring and fall. The black-footed ferret is considered rare in this area since there have been few reported sightings. No habitat in the region has been designated as critical for any of these endangered species, and no other threatened or endangered animal species are known to occur in this area.

The Ash Creek-Youngs Creek area of Sheridan County contains the most diverse habitat of all the coal areas in Wyoming. A population of Lewis' woodpeckers nests in this area. It is one of only two populations of this species known to exist in Wyoming. The burrowing owl lives among the prairie dog towns in this area. The area also contains three sharp-tailed grouse leks and two sage grouse leks, as well as several small black-tailed prairie dog towns. Mule deer and antelope populations in this area have been relatively stable since 1976.

The Tongue River, which runs south and east of the Youngs Creek and Hidden Water tracts and forms the eastern boundary of the Youngs Creek tract, is a Class III fishery of regional importance. The woody riparian habitats along Ash Creek, Youngs Creek, and Little Youngs Creek contain a variety of nongame mammals and bird species several times greater than the number of species found in neighboring sagebrush grasslands.

There are two golden eagle nests on or near the Hidden Water tract. Both of the nests and protective buffer zones around them have been declared unsuitable for surface mining.

A bald eagle nest was discovered in 1983 approximately 1 mile from the Youngs Creek tract, and two young were fledged from the nest in that year. Surface mining was excluded from 120 acres of the Youngs Creek tract to protect bald eagle foraging habitat next to the Tongue River.

Consultation according to section 7 of the Endangered Species Act has been initiated between the BLM and the U.S. Fish and Wildlife Service for all tracts in Wyoming.

Montana

Descriptions of wildlife resources in the Otter Creek, Colstrip, and Decker BLM planning areas appear in the 1981 Coal EIS (USDI, BLM 1981b). No new published data are available for these areas.

BLM personnel surveyed the Mud Springs tract area in 1979 and 1980 to determine the habitat areas used by species of high interest to federal and state governments. The area is most important as mule deer and antelope yearlong habitat. Ponderosa pine and sagebrush grasslands are the two most important habitats for mule deer. Antelope use the sagebrush-grasslands on the tract infrequently. Several raptor species are common in the vicinity, but the tract contains no nests of raptor species of high interest to federal or state government.

The Downey Coulee tract area is characterized by large sandstone bluffs and buttes and by ponderosa pine vegetation. It is primarily mule deer habitat; they use the riparian bottomlands along Rosebud Creek heavily during summer and the ponderosa pine habitat year-round, especially during winter. The tract's suitability for antelope habitat is limited, so most antelope use occurs in late spring and early summer.

A sharp-tailed grouse lek in in the Downey Coulee tract was active in 1980 but inactive in 1981. Another lek was discovered just north of the tract in 1981. The portion of the buffer zone inside the tract was determined to be suitable for mining provided the state of Montana agrees to a mitigation plan. One golden eagle nest is present on the tract, but it overlies private minerals, so no unsuitablility exclusion was made for the nest.

The Hanging Woman Creek area supports large herds of antelope and mule deer. The largest concentration of deer in all seasons occurs in the hills between the East Fork of Trail Creek and Horse Creek (Martin 1980). Antelope also tend to concentrate on the mid-slope areas north

of Trail Creek, especially in winter (Martin 1980).

Three sharp-tailed grouse leks are known in the area. One lek is approximately 600 yards west of the Hanging Woman tract. An area surrounding this lek on the Hanging Woman Creek bottom has been declared unsuitable for mining. The tract also contains two sage grouse leks, and one other sage grouse lek is less than ½ mile from the boundary. The corporation that owns deeded lands on and around the tract and the Montana Department of Fish, Wildlife, and Parks have agreed to a mitigation plan setting aside areas of sagebrush habitat outside the tract for use by grouse.

Several small black-tailed prairie dog towns are on the Hanging Woman Creek tract. The towns were searched for black-footed ferrets in 1980, but no sign of this endangered species was found. Several raptor species of high federal interest nest near the tract, but none are known to nest on the tract.

Consultation according to section 7 of the Endangered Species Act has been initiated between the BLM and the U.S. Fish and Wildlife Service for all tracts in Montana.

CULTURAL RESOURCES

Background

The Powder River region of the Great Plains has witnessed human activity for the past 12,000 years. As a result of this occupation, approximately 8,000 prehistoric and historic sites are known to exist. These cultural resourcesrange from prehistoric hunters' camps to bison kill sites, stone circles, quarries, petroglyphs and pictographs, burials, pottery sites, rock shelters, lithic scatters, and stratified sites caused by continued reuse of a certain area.

In addition, the district also contains ethnohistoric and historic cultural resources. The Indian utilization of a region subsequent to European contact represents the ethnohistorical period; the historic period is the period during which Euorpean-American exploration and settlement occurred. Site types from these periods include trails, battlefields, homesteads, historic mines, and native American religious sites.

In recent years cultural resource inventories have been conducted as a response to increasing energy development. These inventories are undertaken in compliance with Section 106 of the National Historic Preservation Act and Section 2(b) of Executive Order 11593.

However, at present only approximately 4% of the Powder River Basin region has been surveyed for cultural resources at a Class III level. Although two major Class II projects have been completed, "The Western Powder River Basin Survey" (Reher n.d.) and "The Eastern Powder River Basin Survey" (Metcalf-Zier 1981), neither of these two complies with current mine permit stipulations requiring intensive inventory for cultural sites. A Class II study is a 10% sample survey of a selected area. Consequently, though large areas have been surveyed at a Class I literature search level and a Class II sample survey level, these inventories are not of sufficient intensity to "clear" areas for coal mining purposes.

Prehistory

The prehistoric chronology for this region is based largely upon studies completed in neighboring areas. The first chronology for the Powder River Region was developed by Mulloy in 1958 and later revised by Frison in 1978. According to thses studies, the Paleo-Indian period extends from 11,200 to 7,500 years ago; the Early Plains archaic from 7,500 to 5,000 B.P.; the Middle Plains Archaic from 5,000 to 3,000 B.P.; Late Plains Archaic from 3,000 to 1,700 B.P., and the Late Prehistoric from 1,700 to 300 years ago.

Until more research is conducted, the actual significance of sites falling into these different periods is difficult to evaluate. Though archeological investigations have provided enough fundamental information to venture a few suggestions concerning settlement pattern and subsistence strategies, these assumptions are based on limited data. However, generally the greatest site density should occur in areas of highest topographic diversity. Such areas gave prehistoric peoples the ability to exploit the variety of wildlife and plant species that occurred in different ecological zones. The lowest site density, then, should be in large, flat open areas.

Because the number of extensive excavations in the Powder River Region has been small, no particular site type or time period can be evaluated as more significant than another. Any site that

has the ability to contribute new information to our understanding of prehistoric lifeways is significant.

Ethnohistory and History

Ethnography and ethnohistory allow some delineation of tribal movements from about A.D. 1400 to the present. Tribal demography can be seen as a series of population relocations. Between 1400 and 1850 A.D. the Powder River Basin was shared by the Crow, Plains Apache, Shoshoni, Comanche, Cheyenne, Teton Dakota, and Arapahoe.

The first known historic travelers to reach this region were members of Francois Antoine Larocque's Northwest Company. Then in 1811 and 1812 the Astorians from the American Fur Company crossed the divide between the Powder River and the Little Missouri River. Various groups of trappers, traders, missionaries and military men traversed the basin between 1820 and 1860. Emigrant traffic began in 1863 to proceed up the Powder River trail pioneered by John Bozeman and John Jacobs. Because this route violated the last sacred hunting grounds of the regional Native Americans, the trail was the scene of numerous Indian-military and Indian-emigrant conflicts. By 1864 the route was known as the "Bloody Bozeman."

With the end of the Civil War, the government began concentrating its military efforts on subduing the hostile Plains tribes. Notable events occurred along the Bozeman Trail at Crazy Woman Creek, at Fort Phil Kearny, and the Little Big Horn. Both the Fetterman Massacre in 1866 and the Custer Massacre in 1876 were desperate attempts on the part of Powder River tribes to fight off the growing encroachment of whites in their treaty-assured lands. All efforts failed. By the end of the 1870s, the Plains Indian peoples were confined on reservations.

After 1880 homesteaders began settling the region, forming small farms and ranches. Later large cattle companies started competing with the small operations, and conflicts over who had right to the use of open public land resulted in the Johnson County War of 1892.

The railroad reached Gillette, Campbell County, in 1891, and homesteading efforts were stepped up accordingly. Sheep were introduced and energy production pursuits began.

Early coal mines and oil and gas activities were initiated as early as 1882. Large scale oil development began in the 1950s and coal development in the 1970s.

Physical evidence of early homesteading and energy production is present throughout the region.

The Northern Cheyenne Tribe has indicated that there are two religious sites on the Downey Coulee tract. The tribe has been asked to identify the location of the sites, but to date the BLM has received no further information.

Specific numbers of sites in each tract are reported in the individual tract profiles. More extensive discussion of prehistoric and historic activities in the region is included in the 1979 Eastern Powder River coal EIS (USDI, BLM 1979b) and the 1979 Northern Powder River Coal EIS (USDI, GS & Mont. DSL 1979).

VISUAL RESOURCES

The landscape in areas that would be affected in the Montana portion of the region is mostly rolling uplands dissected by steep-sided valleys. Areas of rugged hills and badlands also would be affected. The affected landscape in the Wyoming portion is largely low rolling hills and flat plains. There are rough hills and breaks along the Powder River. The dominant visual element in both the Montana and Wyoming portions of the region is the Big Horn Mountains in the west.

The scenic quality of most of the lands is rated Class B or Class C according to the BLM's visual resource management (VRM) system (USDI, BLM 1980c). These quality ratings, when combined with sensitivity levels and distance zones, form visual management classes. Scenic quality B and C, combined with medium sensitivity and foreground/middleground and background zones, result in management classes of III and IV.

The landscape character of Forest Service lands in the region is generally rated Subtype 6. Variety classes generally are C, with some Class B or Class A areas. Visual quality objectives for these lands range from partial retention through modification to maximum modification. The land classification systems of the Forest Service and the BLM are described in appendix D.

More detailed descriptions of the region's visual resources are available in the Eastern Powder River EIS, the 1981 coal EIS, and the Montana coal EIS (USDI, BLM 1979b, 1981b; USDI, GS & Mont. DSL 1979).

NOISE

Noise levels in rural areas of the region are low (30 to 50 dBA), with most noise sources related to agriculture. The major noise impacts from energy development are related to transportation. Increased vehicular and train traffic has increased noise impact zones along major transportation routes. The major receptors of noise effects are the residents of Miles City, Colstrip, and Forsyth, Montana, and Gillette, Newcastle, Torrington, and Lusk, Wyoming. Noise dissipates rapidly in wide-open rural areas; thus, the effects of mines on rural areas are not as great as those on residential areas within 1 mile of a mine. However, surveys have shown that residents in subdivisions within 1 mile of existing mines in this region have few problems with noise from coal mining (Paul Nelson Asso. 1981).

AIR QUALITY

Background

The basic regulatory framework of the Clean Air Act of 1977 involves national ambient air quality standards (NAAQS) and allowable increments for the prevention of significant deterioration of air quality.

NAAQS are absolute, nationwide limits on the amount of certain pollutants that may be present in the air. No part of the country may exceed these levels. The federal government has set primary standards to protect public health and secondary standards to protect the general public welfare. The states of Wyoming and Montana have set their own ambient standards for the same pollutants, which are at least as stringent as the federal standards (see table 3-3).

The PSD program is designed to protect the air quality from significant deterioration in areas already meeting the NAAQS. In other words, in cleaner areas a specific increase, or "increment," in pollution is allowed above the existing air quality "baseline" pollution levels. In no event, however, may pollution increases exceed the NAAQS.

The size of the increment allowable under the PSD program depends on the area's designation as a Class I, II, or III area, with Class I areas allowed the smallest pollution increment and Class III the largest. In the Clean Air Act of 1977, the Congress designated certain national parks and other such areas as Class I areas. All other areas were designated as Class II. However, Congress provided a procedure for state and tribal governments to redesignate areas under their jurisdiction as Class II or III.

Wyoming's and Montana's PSD standards are identical to the federal standards (see table 3-4). Air quality regulations are discussed further in appendix E.

Air Quality in This Region

A report prepared for the BLM by PEDCo Environmental, Inc. (1983) contains a detailed description of the air quality in the region. Most of the region is federal Class II for PSD. However, the Northern Cheyenne Indian Reservation, which is a Class I PSD area, is within 15 miles of tracts north of Decker.

The maximum allowable increases and the federal, Wyoming, and Montana ambient air quality standards are shown on tables 3-3 and 3-4. State standards for ambient TSP generally are more restrictive than the federal standards, with 24-hour standards being a greater restraint than annual standards.

The background rural TSP annual geometric mean concentration for the region is about 15 micrograms per cubic meter. In and near populated areas and mining activities, particulate levels are significantly higher than background levels (see table 3-5).

No monitored violations of federal ambient TSP standards have occurred in Wyoming in recent years. However, the more restrictive Wyoming annual standard has been violated in Sheridan, and the 24-hour state standard has been marginally violated near several mining locations. Monitoring of gaseous pollutants indicated that concentrations are well within state and federal standards.

Air quality monitoring data show that rural background concentrations of sulfur oxide and nitrogen oxide are as follows:

TABLE 3-3
AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Federal Primary Standards (mcg/m^3)	Federal Primary Standards (ppm)	Wyoming State Standards (mcg/m^3)	Wyoming State Standards (ppm)	Montana State Standards (mcg/m^3)	Montana State Standards (ppm)
Sulfur dioxide	Annual (arithmetic)	80	0.03	80	0.02		0.02
	24-hour	365	0.14	260	0.10		0.10
	3-hour			1,300	0.50		0.50
Total suspended particulates	Annual (geometric)	75		60		75	
	24-hour	260		150		200	
Carbon monoxide	8-hour	10,000	9.00	10,000	9.00		9.00
	1-hour	40,000	35.00	40,000	35.00		22.00
Photochemical oxidant	1-hour	240	0.12	160	0.08		0.08
Nitrogen dioxide	Annual	100	0.05	100	0.05		0.05

SOURCES: National Ambient Air Quality Standards 1970; Wyoming Department of Environmental Quality 1975; Montana State Department of Health and Environmental Sciences 1983.

mcg/m^3 = micrograms per cubic meter. ppm = parts per million

TABLE 3-4
MAXIMUM ALLOWABLE INCREASES
FOR PREVENTION OF SIGNIFICANT DETERIORATION OF AIR QUALITY

Pollutant	Averaging Time	Maximum Allowable Air Quality Increases (micrograms per cubic meter) Class I	Class II	Class III
Sulfur dioxide	Annual mean	2	20	40
	24-hour[a]	5	91	182
	3-hour[a]	25	512	700
Total suspended particulates (TSP)	Annual mean	5	19	37
	24-hour[a]	10	37	75

NOTE: These are federal, Wyoming, and Montana ambient air quality standards.

a. The increments for these averaging times are not to be exceeded more than once per year.

Annual arithemtic mean: sulfur oxide, 1 microgram per cubic meter; nitrogen oxide, 2 micrograms per cubic meter.

Maximum 24-hour: sulfur oxide and nitrogen oxide, 9 micrograms per cubic meter.

The only significant sources of sulfur oxide and nitrogen oxide in Wyoming are three power plant units near Gillette.

In Montana, both federal and state ambient annual and 24-hour TSP standards have been violated in the Colstrip area. Colstrip has been designated nonattainment for particulate. Elsewhere, federal and state 24-hour standards are violated near mining areas. No monitoring data for gaseous pollutants were found.

The rural background concentrations measured in Wyoming were assumed to be representative for the Montana portion of the study area. The principal sources of sulfur oxide and nitrogen oxide in Montana are the Colstrip power plant units 1 through 4.

Visibility greater than 60 miles is common. Significant reductions in visibility are generally weather related.

The only mining operations included in the air quality modeling were those that either were in production or had indicated an intention to start the permitting process. The Cook Mountain tract was inadvertently omitted, but it will be analyzed in another computer run to be made before the final EIS is released. The site-specific analysis of the Cook Mountain tract by PEDCo in 1980 did not forecast violations of air quality standards.

TABLE 3-5
AMBIENT BACKGROUND CONCENTRATIONS OF POLLUTANTS
IN THE POWDER RIVER REGION

Pollutant	Concentration in micrograms per cubic meter
Sulfur dioxide	
Maximum annual arithmetic mean	1
24-hour maximum	9
3-hour maximum[a]	27
1-hour maximum	82
Total suspended particulates	
Maximum annual geometric mean	15
24-hour maximum	61.5
Nitrogen dioxide	
Maximum annual arithmetic mean	2
24-hour maximum	9

SOURCE: Figures for background concentrations supplied by the state of Wyoming.

a. Estimate based on rough interpolation between 1-hour and 24-hour maxima; no monitoring data are available for the 3-hour maximum.

TRANSPORTATION FACILITIES

Burlington Northern Railroad operates three main rail lines within the Powder River region. Most coal is carried east on these lines. The Chicago and North Western/Union Pacific line to be constructed in southeastern Wyoming is expected to begin moving coal when construction is completed, reaching a plateau in the amount hauled by 1991 (US, Dept. of Trans. 1980).

Major highways and trafficways are shown on the Regional Activity map, as are rail routes. Outlying areas in the region are connected by a system of county roads, private roads, Forest Service roads, and in Montana, Indian reservation roads.

Resurfacing is planned during the next six years on the section of U.S. Highway 212 from Crow Agency to Busby and from Lame Deer to Ashland. General maintenance along these sections currently costs approximately $3,000 per mile. The section from Lame Deer to Ashland is a heavy snowfall area. The Montana State Highway Department is attempting to implement a pavement management program, which would involve installing a seal coat every 10 years and an overlay every 20 years on highways in this area (Braut 1983).

Wyoming Highway 59 from Gillette to Reno Junction is being reconstructed and should keep up with development in that area. However, Wyoming 59 north of Gillette and U.S 14-16 north of Gillette do not have the structural design or alignment to handle large volumes of traffic from increased development.

There are no current plans to reconstruct either of these roads. An overlay is planned for 18 miles of Wyoming 59 in 1984. Four miles of Wyoming 338 north of Sheridan are to be reconstructed in 1984, and the section of thathighway from the new section around the Big Horn Mine north to the Montana state line is to be reconstructed in 1987 (Hanlin 1983).

Highway and rail systems are discussed further in previously published documents (USDI, BLM 1979b, 1981b; USDI, GS, & Mont. DSL 1979).

A coal slurry pipeline operated by Energy Transportation Systems, Inc., (ETSI) is expected to begin transporting coal by 1990. Slurry preparation plants are planned for the North Rawhide, North Antelope, and Jacobs Ranch areas in Campbell County. The pipeline would compete with railroads hauling coal out of the Powder River Region. More information on the pipeline is available in the ETSI pipeline EIS (USDI, BLM & Woodward-Clyde 1980).

EMPLOYMENT AND SALARIES AND WAGES

This section presents projections of ongoing trends in employment and in salaries and wages for benchmark years in the Powder River Region. All employment projections are based on the regional industrial development that is presented in appendix B. It should be noted that plans that had been formulated for the construction of power plants and generating units in the latter part of the 1980s have been postponed indefinitely. After the completion of Colstrip units 3 and 4, no power plant construction is projected in the region. This is apparently due to forecasts for less demand for electricity than heretofore expected.

The Eastern and Western Powder River Region

General

Soft markets for uranium and coal, the recent recession, and a depressed oil and gas industry have served to lower employment forecasts in many Wyoming counties through 1985. A 12% decline is expected in employment in Converse County by 1985 (see table 3-6). In addition, the closing of the CF&I iron mine and the completion of new railroad facilities in Platte County provide the basis for a 29% decline in Platte County employment by 1985. Firming coal and uranium markets and an improved oil and gas outlook in the last half of the 1980s will increase employment levels substantially by 1990 in all counties except Platte County, which will remain at 80% of the 1980 employment level.

Sheridan County

Employment levels in Sheridan county are unique in that they contain secondary employment induced by development in Montana as well as development in Wyoming. Table 3-7 presents an estimate of the secondary employment induced in Sheridan County by Montana development and estimates of the number of persons employed

TABLE 3-6
PROJECTED TRENDS FOR COVERED EMPLOYMENT[a]
AND SALARIES AND WAGES IN BENCHMARK YEARS
FOR THE EASTERN AND WESTERN POWDER RIVER REGION

(salaries and wages are in millions of dollars)

County/Sector	1980[b]		1985[c]		1987[c]		1988[c]		1990[c]		1995[c]	
	Employment	Salaries and Wages	Employment	Salaries and Wages	Employment	Salaries and Wages	Employment	Salaries and Wages	Employment	Salaries and Wages	Employment	Salaries and Wages
Campbell County												
Coal employment	2,022	54.3	6,200	166.6	7,900	212.1	8,800	236.2	10,500	281.3	12,500	335.6
Construction employment	2,331	49.4	880	18.7	4,400	93.3	4,500	95.4	2,100	44.5	1,200	25.4
All other employment	9,053	151.1	9,920	165.6	10,900	181.9	11,200	186.9	11,900	198.6	12,900	215.3
All covered employment	13,406	254.8	17,000	350.9	23,200	487.3	24,500	518.5	24,500	524.4	26,600	576.3
Converse County												
Coal employment	162	4.0	230	5.6	530	13.2	690	17.2	990	24.7	1,100	27.0
Construction employment	598	12.0	590	11.7	1,600	32.1	1,600	32.1	610	12.2	620	12.4
All other employment	5,171	91.2	4,380	77.2	4,970	87.7	5,110	90.1	5,400	95.2	5,780	101.9
All covered employment	5,931	107.2	5,200	94.5	7,100	133.0	7,400	139.4	7,000	132.1	7,500	141.3
Crook County												
Coal employment	---	---	---	---	---	---	---	---	---	---	---	---
Construction employment	166	2.8	170	2.9	170	2.9	170	2.9	170	2.9	170	2.9
All other employment	1,279	16.2	1,330	16.8	1,330	16.8	1,430	18.1	1,430	18.1	1,430	18.1
All covered employment	1,445	19.0	1,500	19.7	1,500	19.7	1,600	21.0	1,600	21.0	1,600	21.0
Goshen County												
Mining and construction[d]	300	4.1	300	4.1	300	4.1	300	4.1	310	4.2	310	4.2
All other employment	3,120	31.1	3,300	32.9	3,600	35.9	3,600	35.9	3,690	36.8	3,790	37.8
All covered employment	3,420	35.2	3,600	37.0	3,900	40.0	3,900	40.0	4,000	41.0	4,100	42.0
Johnson County												
Coal employment	---	---	---	---	---	---	---	---	---	---	---	---
Construction employment	245	3.5	240	3.4	250	3.6	250	3.6	250	3.6	250	3.6
All other employment	2,040	23.7	2,160	25.1	2,350	27.3	2,450	28.5	2,550	29.6	2,550	29.6
All covered employment	2,285	27.2	2,400	28.5	2,600	30.9	2,700	32.7	2,800	33.2	2,800	33.2
Natrona County												
Coal employment	---	---	---	---	---	---	---	---	---	---	---	---
Construction employment	3,677	69.0	3,600	67.6	3,700	69.4	3,700	69.4	3,800	71.3	3,800	71.3
All other employment	33,925	590.3	35,900	624.7	38,300	666.4	38,900	676.9	39,300	683.8	40,700	708.2
All covered employment	37,602	659.3	39,500	692.3	42,000	735.8	42,600	746.3	43,100	755.1	44,500	779.5

Niobrara County												
Mining and construction[d]	114	1.7	120	1.8	120	1.8	120	1.8	120	1.8	130	1.9
All other employment	619	5.8	660	6.2	690	6.5	700	6.6	710	6.7	730	6.8
All covered employment	733	7.5	780	8.0	810	8.3	820	8.4	830	8.5	860	8.7
Platte County												
Mining and construction[d]	1,366	34.0	10	0.2	10	0.2	10	0.2	10	0.2	10	0.2
All other employment	2,296	24.9	2,590	28.1	2,890	31.3	2,890	31.3	2,990	32.4	3,090	33.5
All covered employment	3,662	58.9	2,600	28.3	2,900	31.5	2,900	31.5	3,000	32.6	3,100	33.7
Sheridan County												
A separate table has been prepared for Sheridan County because some impacts to that county will come from mining in the Northern Powder River Region. See table 3-4.												
Weston County												
Coal employment	---	---	---	---	---	---	---	---	---	---	---	---
Construction employment	257	4.0	250	3.9	260	4.0	260	4.0	260	4.0	270	4.2
All other employment	2,291	33.3	2,950	42.9	3,040	44.2	3,040	44.2	3,140	45.6	3,130	45.5
All covered employment	2,548	37.3	3,200	46.8	3,300	48.2	3,300	48.2	3,400	49.6	3,400	49.7

NOTE: Figures may not add due to rounding.

a. "Covered employment" is employment that is covered by unemployment insurance, as reported for the county of employment by the Wyoming Employment Security Commission (WESC).

b. Except for coal employment, all 1980 employment shown herein is actual covered employment as published by WESC. Coal employment for 1980 is an estimate based on industrial planning or the relative weight of coal activity compared to all mining in the county. All 1980 salaries and wages are actual salaries and wages paid to covered employment in 1980, as published by the WESC.

c. All employment projections are derived from the Casper District input-output model. All salary and wage projections are based on 1980 average weekly wages as published by the WESC.

d. Mining and construction have been combined for Goshen, Niobrara, and Platte counties so that individual operations will not be disclosed.

in Big Horn and Powder River counties who will reside in Sheridan County. The secondary employment will reach an interim peak in 1987 as a result of cumulative construction projects in Montana at that time.

The Northern Powder River Region

Table 3-8 presents estimates of employment and salaries and wages for benchmark years in the Northern Powder River region. All counties in this section will experience an interim peak in employment in 1987 because of the cumulative effects of the construction of coal mines and the Tongue River railroad. Employment levels will decline somewhat between 1987 and 1990. Regional coal mines will reach the capacity for full production in 1990, and employment levels should arrive at a plateau between 1990 and 1995.

The Crow and Northern Cheyenne Tribes

Table 3-9 presents estimates of labor force, employment, and unemployment among the Crow and Northern Cheyenne Indians for benchmark years. Figures for 1980 from the Bureau of Indian Affairs, U.S. Department of the Interior (BIA), indicate high unemployment rates for both tribes: 43% for the Crow and 48% for the Northern Cheyenne. Preferential hiring agreements would help to lower these rates.

The Crow Tribe has leased coal on the reservation and as part of that action required preferential hiring of Crow Indians to produce the coal.

Data on wages and salaries among the Indians are not available, but low incomes can readily be assumed in light of the high unemployment rates. In this regard, the assumption can also be easily made that increased employment would raise income levels among the Indians.

POPULATION AND HOUSING

This section presents projections of ongoing trends in population and housing requirements for benchmark years in the Powder River Region. Figures 3-1, 3-2, and 3-3 depict these trends graphically for the counties that will be directly affected by federal coal leasing in 1984. Tables 3-10 through 3-13 present the population projections and housing requirements for the entire region.

The Eastern and Western Powder River Region

General

As with employment trends, Converse and Platte counties will experience a decline in population through 1985, after which Converse County will experience a substantial increase in population (see table 3-10). Platte County will remain at 80% of the 1980 population level, or less, through 1995.

Sheridan County

It is estimated that about 6% of the population in Sheridan County in 1980 was the result, both directly and indirectly, of Montana development. The portion of Sheridan County population that is attributable to Montana developments is expected to grow to about 12½% by 1990 (see table 3-11).

The Northern Powder River Region

Unlike employment trends in the Northern Powder River Region, the only discernable interim peak in population will occur in Big Horn County in 1987 (see table 3-12). This is due to the lower population effects resulting from construction projects, to which the pronounced peak in employment is attributable. Even with the interim peak, 1990 population in Big Horn County is expected to be about 11% greater than that of 1987.

The Crow and Northern Cheyenne Indian Reservations

Table 3-13 presents population projections for the Crow and Northern Cheyenne reservations for benchmark years. In general, population trends on the reservation will follow the population trends of the counties in which the reservations are situated.

TABLE 3-7
PROJECTED TRENDS FOR COVERED EMPLOYMENT[a]
AND SALARIES AND WAGES IN BENCHMARK YEARS
FOR SHERIDAN COUNTY

(salaries and wages are in millions of dollars)

	1980[b]		1985[c]		1987[c]		1988[c]		1990[c]		1995[c]	
	Employment	Salaries and Wages	Employment	Salaries and Wages	Employment	Salaries and Wages	Employment	Salaries and Wages	Employment	Salaries and Wages	Employment	Salaries and Wages
Coal employment	300	7.5	440	11.0	660	16.6	770	19.3	990	24.9	990	24.9
Construction employment	1,127	18.6	1,100	18.3	1,500	24.8	1,500	24.8	1,150	18.9	1,200	19.8
All other employment	6,726	76.4	7,260	82.5	7,810	88.7	7,830	88.9	8,060	91.6	8,210	93.3
All covered employment	8,153	102.5	8,800	111.8	9,900	130.1	10,100	133.0	10,200	135.4	10,400	138.0
Secondary employment induced in Sheridan County by Montana employment[d]	70	0.8	100	1.2	230	2.7	100	1.2	300	3.6	300	3.6
Montana workers residing in Sheridan County[e]	490	13.8	750	21.1	750	21.1	890	25.0	1,140	32.0	1,140	32.0

NOTE: Except as noted, 1980 figures are actual data as reported by the Wyoming Employment Security Commission (WESC).

a. "Covered employment" is employment that is covered by unemployment insurance, as reported for the county of employment by the WESC.

b. Employment projections are derived from the Casper District input-output model. Salary and wage projections are based on 1980 average weekly wages published by the WESC.

c. Coal employment for 1980 is an estimate based on industrial planning and the relative weight of coal activity compared to all mining in the county.

d. Estimate of employment induced in Sheridan County by primary employment in neighboring Montana counties. See footnote "c" to table 3-8 for the methodology used in projecting induced employment. Because covered employment is reported by county of employment, these numbers are included in Sheridan County employment.

e. Industrial estimates of the number of Big Horn County coal mine employees living in Sheridan County in 1982 were 50.89% of estimated 1982 coal employment in Big Horn County. That percentage was used to estimate the number of persons employed in Big Horn County who might reside in Sheridan County for the years indicated. Because covered employment is reported by county of employment, these numbers are included in Big Horn County and Powder River County employment.

TABLE 3-8
PROJECTED TRENDS FOR COVERED EMPLOYMENT
AND SALARIES AND WAGES IN BENCHMARK YEARS
FOR THE NORTHERN POWDER RIVER REGION
(salaries and wages are in millions of dollars)

County/Sector	1980[a]		1985		1987		1988		1990		1995	
	Employment	Salaries and Wages	Employment	Salaries and Wages	Employment	Salaries and Wages	Employment	Salaries and Wages	Employment	Salaries and Wages	Employment	Salaries and Wages
Big Horn County												
Coal employment[b]	954	26.8	1,480	41.6	1,480	41.6	1,750	49.4	2,240	63.1	2,240	63.1
Construction employment[c,d]	589	17.3	320	9.5	1,250	36.8	320	9.5	420	12.3	420	12.4
All other employment[c]	2,351	25.4	2,420	26.1	2,520	27.2	2,400	26.0	2,570	27.8	2,580	27.8
All covered employment	3,894	69.6	4,200	77.2	5,200	105.6	4,500	85.9	5,200	103.2	5,200	103.3
Powder River County												
Coal employment[b]	15	0.3	---	---	---	---	150	3.3	440	9.5	440	9.5
Construction employment[c,d]	33	0.5	30	0.5	550	8.0	30	0.5	40	0.5	40	0.5
All other employment[c]	529	5.8	540	5.9	560	6.1	560	6.1	580	6.3	590	6.4
All covered employment	577	6.6	580	6.4	1,100	14.1	750	9.9	1,100	16.3	1,100	16.4
Rosebud County												
Coal employment[b]	432	12.1	880	24.8	1,040	29.2	1,240	34.7	1,340	37.5	1,410	39.7
Construction employment[c,d]	707	14.9	840	17.8	1,130	23.9	940	19.8	820	17.3	810	17.1
All other employment[c]	2,337	23.3	2,450	24.5	2,620	26.2	2,450	24.5	2,690	26.8	2,700	26.9
All covered employment	3,476	50.3	4,200	67.1	4,800	79.3	4,600	79.0	4,800	81.6	4,900	83.7

NOTE: Figures may not add due to rounding.

a. The 1980 employment is the annual average of monthly employment covered by unemployment insurance, as reported for the county of employment. The 1980 salaries and wages are a summation of covered quarterly salaries and wages. Monthly and quarterly data for 1980 were furnished by the Employment Security Division of the Montana Department of Labor and Industry.

b. The 1980 coal employment is an estimate derived from covered mining employment on the basis of the amount of coal activity compared to other mining activity in the county. Projections of coal employment are based on the relationship of one additional employee for each additional 25,300 tons of projected coal capacity (relationship derived from the Casper District input-output model). Salaries and wages for coal are based on the 1980 weekly average wage for mining.

c. Projected secondary employment is estimated at one additional job in the region for each additional permanent job in energy and 0.5 additional job in the region for each temporary job (as derived from the Casper District input-output model). The secondary employment is then distributed among sectors on the basis of each sector's share of the ten-year (1970-1980) regional change in all employment less mining. The secondary sector change is then distributed to the counties on the basis of each county's share of the ten-year (1970-1980) change in regional employment in that sector. Salaries and wages are projected on the basis of 1980 average weekly wages.

d. Construction projections include construction employment for mines, power plants, and railroads, as applicable, in addition to secondary construction employment. Construction estimates for major projects were obtained from industrial planning and environmental impact statements.

TABLE 3-9
LABOR FORCE, EMPLOYMENT, AND UNEMPLOYMENT
AMONG THE CROW AND NORTHERN CHEYENNE INDIANS IN 1980
WITH PROJECTIONS FOR BENCHMARK YEARS

	1980	1985	1987	1988	1990	1995
Crow Indians						
Labor force	2,019	2,250	2,550	2,400	2,760	2,810
Employment	1,147	1,280	1,450	1,360	1,570	1,600
Unemployment	872	970	1,100	1,040	1,190	1,210
Northern Cheyenne Indians						
Labor force	1,703	2,030	2,250	2,250	2,470	2,530
Employment	886	1,060	1,170	1,170	1,290	1,310
Unemployment	817	970	1,080	1,080	1,190	1,210

NOTE: Data for 1980 are from the Bureau of Indian Affairs, U.S. Department of the Interior. Projections are based on the 1980 ratios of labor force, employment, and unemployment to the population of Indians on the reservation. Figures may not add due to rounding.

REVENUES AND EXPENDITURES

Expenditure Levels

This section presents projections of local expenditure levels for benchmark years in the Powder River Region. The projections are based on per capita spending in the base year, 1979-1980. This was done to maintain the spending standards of the base year. For that reason, debt servicing was included in the base year expenditures. For purposes of this section, it is assumed that projected expenditures will be supported by taxation, user fees, grants, or deficit spending. In instances where localities cannot utilize any of these measures, it must be assumed that requirements for new or additional facilities or services will not be met. In localities where services and facilities are already considered inadequate, it must be further assumed that additional needs will further aggravate an already bad situation.

Projected expenditures follow the trend in employment and population throughout the region (see tables 3-14 through 3-16).

Funding

This section is intended only to indicate the primary sources of funds for local entities in the region. It is not a detailed analysis of the tax structure.

The Eastern and Western Powder River Region

Primary sources of funding for counties in the Eastern and Western Powder River Region include property taxes, sales and use taxes, and bonded indebtedness. Primary sources for communities include sales and use taxes, grants, and bonded indebtedness. Funding for schools is primarily from property taxes, mineral royalty payments, and bonded indebtedness. Funding for water, sewer, highway, road, and street projects in areas either directly or indirectly affected by the production of coal is allocated by the Wyoming Farm Board from the coal severance tax.

It should be noted that there is no mechanism to allocate funds to Sheridan County from Montana coal developments. All severance taxes from Montana coal development accrue to the state of Montana, but a substantial portion of the population impacts occur in Sheridan County. For this reason, some Sheridan County residents would welcome coal development in Sheridan County if only to broaden the tax base.

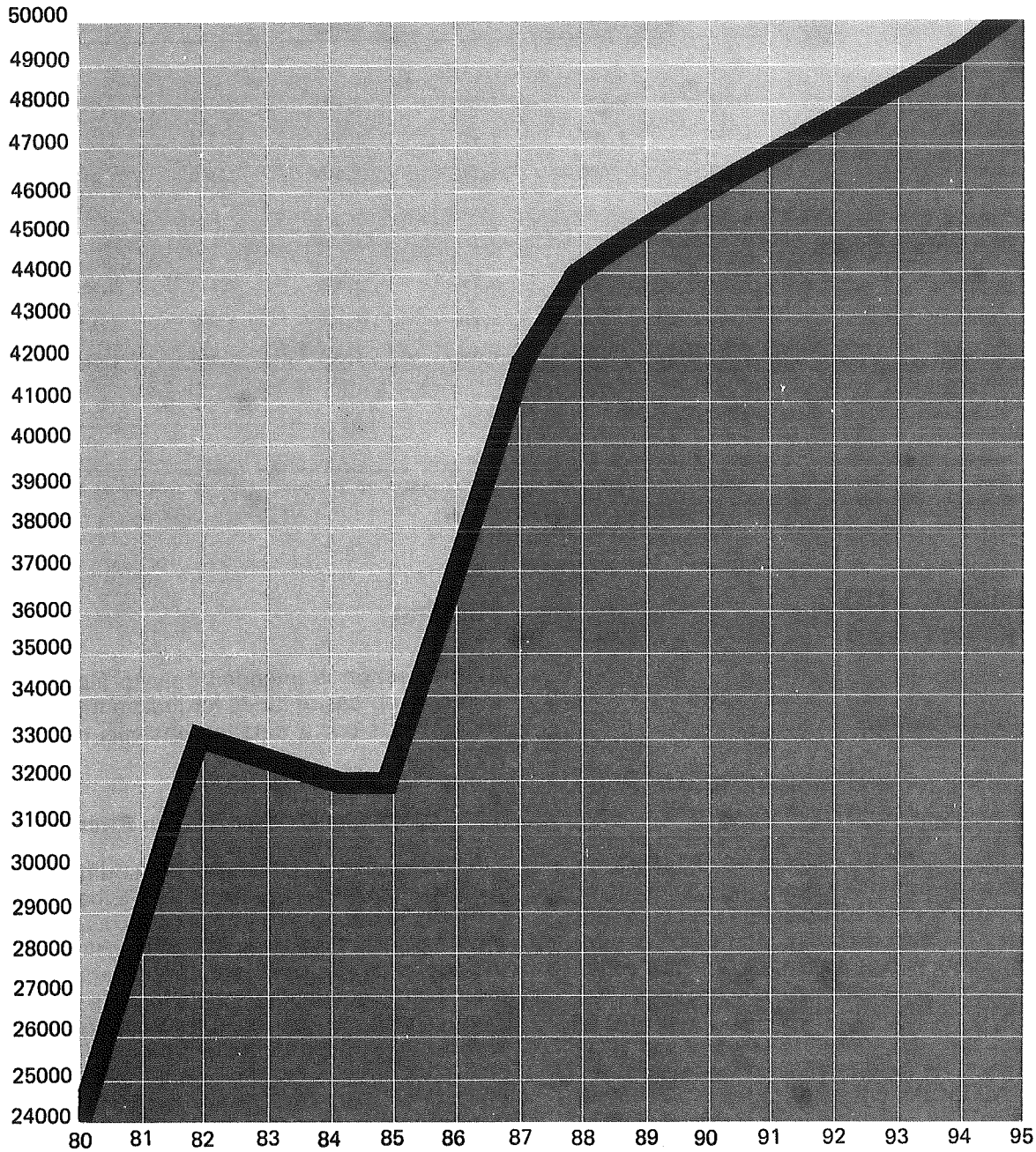

Figure 3-1
POPULATION TRENDS
EASTERN POWDER RIVER – CAMPBELL COUNTY

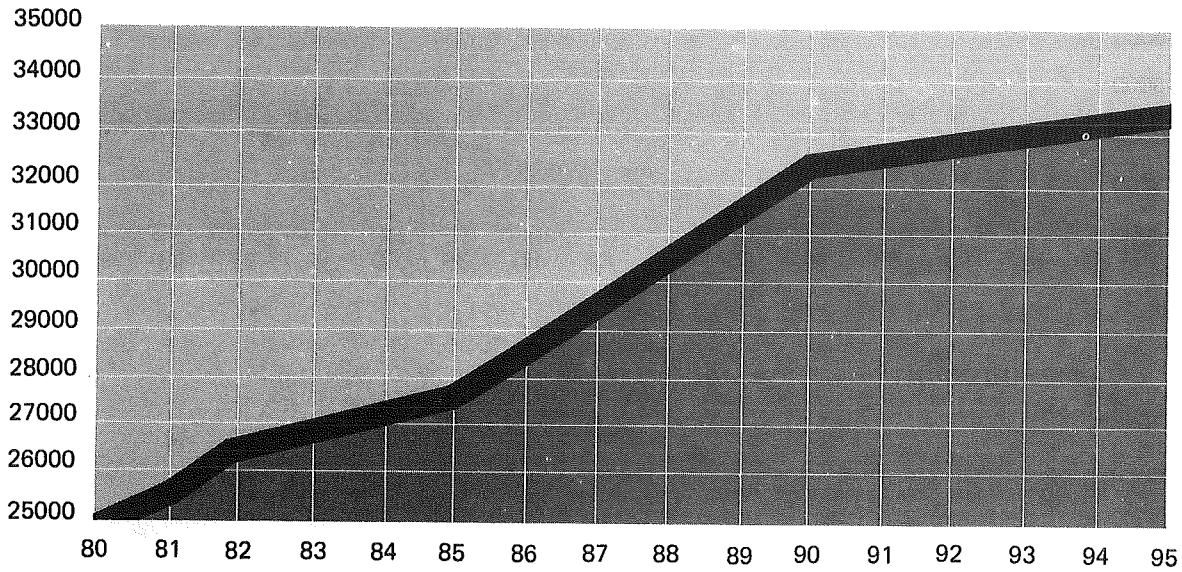

Figure 3-2
POPULATION TRENDS
WESTERN POWDER RIVER – SHERIDAN COUNTY

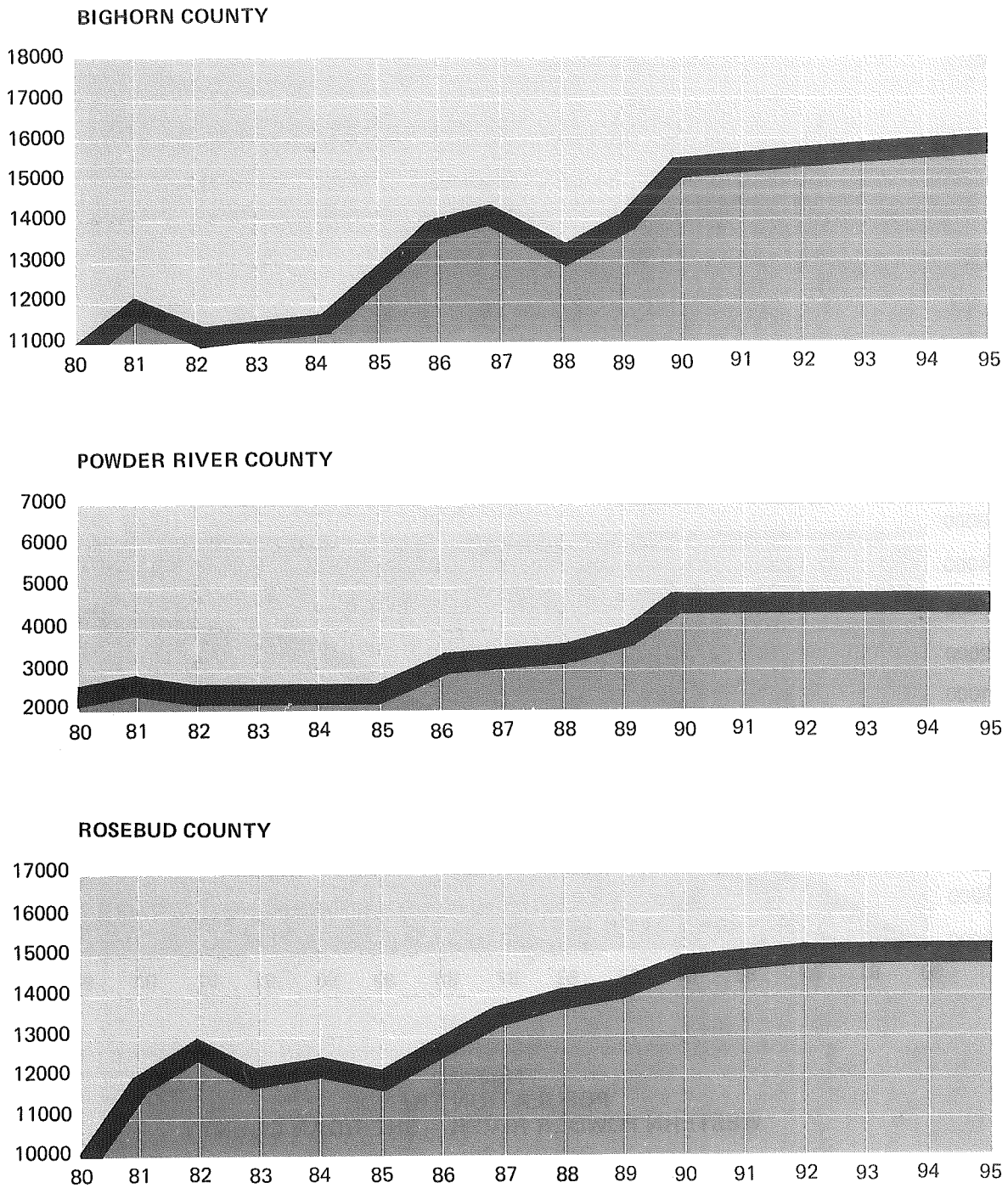

Figure 3-3
POPULATION TRENDS
NORTHERN POWDER RIVER

TABLE 3-10
ESTIMATED POPULATION TRENDS AND HOUSING NEEDS FOR BENCHMARK YEARS
IN THE EASTERN AND WESTERN POWDER RIVER REGION

	1980[a]		1985[a]		1987[a]		1988[a]		1990[a]		1995[a]	
County/Community	Population	Housing	Population	Housing	Population	Housing	Population	Housing	Population	Housing	Population	Housing
Campbell[b]	24,367	9,505	31,900	12,400	41,500	16,200	43,900	17,100	45,600	17,800	50,000	19,500
Gillette	12,134	4,857	15,900	6,400	20,700	8,300	21,900	8,800	22,700	9,100	24,900	10,000
Converse[c]	14,069	5,350	12,400	4,700	15,700	6,000	16,400	6,200	16,700	6,400	17,500	6,700
Douglas	6,030	2,338	5,300	2,100	6,700	2,600	7,000	2,700	7,100	2,800	7,500	2,900
Glenrock	2,736	1,044	2,410	920	3,050	1,160	3,190	1,220	3,250	1,240	3,400	1,300
Crook[d]	5,308	2,434	5,400	2,500	5,600	2,580	5,700	2,630	5,800	2,660	5,900	2,700
Sundance	1,087	479	1,120	490	1,150	510	1,180	520	1,190	520	1,200	530
Moorcroft	1,014	442	1,040	450	1,080	470	1,100	480	1,110	480	1,120	490
Goshen[d]	12,040	5,017	13,200	5,500	14,100	5,900	14,300	6,000	14,600	6,100	15,000	6,300
Torrington	5,441	2,231	6,000	2,460	6,400	2,600	6,500	2,670	6,600	2,700	6,800	2,790
Johnson[d]	6,700	3,029	7,000	3,200	7,600	3,400	7,900	3,600	8,100	3,700	8,300	3,800
Buffalo	3,799	1,673	3,950	1,740	4,300	1,890	4,500	1,980	4,600	2,020	4,700	2,070
Natrona[d]	71,856	28,493	76,800	30,500	81,500	32,300	82,800	32,800	83,800	33,200	86,500	34,300
Casper	51,016	20,259	54,500	21,600	57,900	23,000	58,800	23,400	59,500	23,600	61,400	24,400
Niobrara[d]	2,924	1,434	3,020	1,480	3,130	1,540	3,170	1,550	3,200	1,570	3,250	1,590
Lusk	1,650	777	1,710	810	1,760	830	1,790	840	1,800	850	1,830	860
Platte[d]	11,975	5,053	8,300	3,500	8,900	3,800	9,100	3,800	9,200	3,900	9,500	4,000
Guernsey	1,991	871	1,380	600	1,480	650	1,510	660	1,530	670	1,580	690
Wheatland	5,816	2,516	4,000	1,730	4,300	1,860	4,400	1,900	4,500	1,950	4,600	1,990
Sheridan: A separate table has been prepared for Sheridan County because some impacts to that county will come from mining in the Northern Powder River Region. See table 3-11.												
Weston[d]	7,106	2,900	9,400	3,800	9,700	4,000	9,800	4,000	9,900	4,000	10,100	4,100
Newcastle	3,596	1,443	4,800	1,920	4,900	1,970	5,000	2,010	5,000	2,010	5,100	2,050
Upton	1,193	525	1,590	700	1,630	720	1,650	730	1,660	730	1,690	740

a. Figures for 1980 are from the actual census count. Trends were derived by applying 1980 population-to-employment ratios to projected employment. Housing requirements are based on the number of persons per house in 1980.

b. For Campbell County, a ratio of 1.888 was used for permanent employment, plus 1.209 for temporary employment.

c. For Converse County, a ratio of 2.3721 was used for permanent employment, plus 1.209 for temporary employment.

d. Ratios applied for all employment in each county are as follows: Crook, 3.681; Goshen, 3.636; Johnson, 2.932; Natrona, 1.943; Niobrara, 3.868; Platte, 3.097; Weston, 2.981.

TABLE 3-11
ESTIMATED POPULATION TRENDS AND HOUSING NEEDS IN BENCHMARK YEARS
FOR SHERIDAN COUNTY

	1980		1985		1987		1988		1990		1995	
	Population[a]	Housing[b]	Population[a]	Housing[b]	Population[a]	Housing[b]	Population[a]	Housing[b]	Population[a]	Housing[b]	Population[a]	Housing[b]
Primary impact of Montana employment	1,410	620	2,180	950	2,180	950	2,590	1,130	3,300	1,440	3,300	1,440
Secondary impact of Montana employment	190	80	280	120	670	290	290	130	800	350	820	360
Base without Montana impacts[c]	23,500	10,300	25,000	10,900	27,100	11,800	28,000	12,200	28,500	12,400	29,300	12,800
County total	25,048	10,928	27,500	12,000	29,900	13,000	30,900	13,500	32,600	14,200	33,400	14,600
City of Sheridan	15,146	6,604	16,600	7,200	18,100	7,900	18,700	8,200	19,700	8,600	20,200	8,800

NOTE: The totals for 1980 are actual census data. Figures may not add due to rounding.

a. Projections of total Sheridan County population are based on the 1980 population-to-employment ratio of 2.8997 for permanent employment, plus 1.2085 for temporary employment. Estimates of primary and secondary impacts to Sheridan County due to Montana employment were made after the population-to-employment ratio was modified by alternately adding and subtracting Montana employment and its effects from Sheridan County employment and population in each projected year. City population is projected at its 1980 share (60.47%) of county population.

b. Housing projections are based on 1980 ratio of 2.292 persons per house for the county and 2.293 persons per house for the city.

c. Base population and housing were derived by subtracting primary and secondary impacts from the total.

TABLE 3-12
ESTIMATED POPULATION TRENDS AND HOUSING NEEDS FOR BENCHMARK YEARS
IN THE NORTHERN POWDER RIVER REGION

(figures may not add due to rounding)

	1980		1985		1987		1988		1990		1995	
	Population	Housing	Population	Housing	Population	Housing	Population	Housing	Population	Housing	Population	Housing
Big Horn County[a]	11,096	3,867	12,600	4,400	14,100	4,900	13,400	4,700	15,600	5,400	15,700	5,500
Crow Reservation Div.[b]	5,645	1,734	6,400	1,970	7,200	2,210	6,800	2,090	7,900	2,430	8,000	2,460
Hardin Division[b]	4,249	1,737	4,800	1,960	5,400	2,210	5,100	2,090	6,000	2,450	6,000	2,450
Hardin[b]	3,300	1,360	3,700	1,520	4,200	1,730	4,000	1,650	4,600	1,900	4,700	1,940
Northern Cheyenne Div.[b]	1,013	288	1,150	330	1,300	370	1,220	350	1,420	400	1,430	410
Tongue River Division[b]	189	108	210	120	240	140	230	130	270	150	270	150
Powder River County[c]	2,520	1,123	2,520	1,123	3,250	1,450	3,260	1,450	4,640	2,070	4,640	2,070
Broadus Division[b]	1,321	612	1,321	612	1,700	790	1,710	790	2,430	1,130	2,430	1,130
Broadus[b,d]	715	337	715	337	920	430	920	430	1,320	620	1,320	620
East Powder River Div.[b]	725	303	725	303	940	390	940	390	1,340	560	1,340	560
Otter Division[b]	474	208	474	208	610	270	610	270	870	380	870	380
Rosebud County[e]	9,899	3,787	11,900	4,600	13,400	5,100	13,900	5,300	14,500	5,500	14,700	5,600
Ashland Division[b,f]	564	248	680	300	760	330	790	350	830	370	840	370
Ashland[f,g]	415	128	500	150	560	170	580	180	610	190	620	190
Forsyth Division[b]	3,516	1,472	4,200	1,760	4,700	1,970	4,900	2,050	5,100	2,140	5,200	2,180
Forsyth[b]	2,553	1,053	3,100	1,280	3,400	1,400	3,600	1,490	3,700	1,530	3,800	570
Northern Cheyenne Div.[b]	2,651	758	3,200	920	3,600	1,030	3,700	1,060	3,900	1,120	4,000	1,140
Rosebud Division[b]	3,168	1,309	3,800	1,570	4,300	1,780	4,400	1,820	4,600	1,900	4,700	1,940
Colstrip[b]	1,476	475	1,770	590	1,990	640	2,070	670	2,160	700	2,200	710

NOTE: Figures for 1980 are from the actual census count, except where otherwise noted. Housing needs based on 1980 ratio of persons per house.

a. Trends were derived by applying 1980 population-to-employment ratios to projected employment. A ratio of 2.992 was used for permanent employment, plus 1.256 for temporary employment.

b. Trends are based on the 1980 share of county population.

c. Trends were derived by applying 1980 population-to-employment ratios to projected employment. A ratio of 4.367 was used for permanent employment, plus 1.263 for temporary employment. As there was no apparent temporary population in Powder River County in 1980, the average of the temporary ratios for Rosebud and Big Horn counties was used for Powder River County.

d. The 1980 figures for Broadus are from the preliminary census releases.

e. Trends were derived by applying 1980 population-to-employment ratios to projected employment. A ratio of 2.997 was used for permanent employment, plus 1.270 for temporary employment.

f. Not to be confused with the Ashland District of the Northern Cheyenne Reservation.

g. Figure for 1980 is an estimate from the Miles City District, BLM.

TABLE 3-13
ESTIMATED POPULATION TRENDS AND HOUSING NEEDS IN BENCHMARK YEARS
FOR THE CROW AND NORTHERN CHEYENNE INDIAN RESERVATIONS

	1980		1985		1987		1988		1990		1995	
	Population	Housing	Population	Housing	Population	Housing	Population	Housing	Population	Housing	Population	Housing
Crow Reservation												
Indian	3,953	801	4,400	890	5,000	1,010	4,700	950	5,400	1,090	5,500	1,110
Non-Indian	2,020	1,038	2,270	1,170	2,540	1,310	2,400	1,230	2,770	1,420	2,810	1,440
Reservation total[a]	5,973	1,839	6,700	2,060	7,500	2,310	7,100	2,190	8,200	2,520	8,300	2,560
Lodge Grass	771	215	860	240	970	270	920	260	1,060	300	1,070	300
Northern Cheyenne Reservation												
Indian	3,101	718	3,700	860	4,100	950	4,100	950	4,500	1,040	4,600	1,070
Non-Indian	563	328	680	400	750	440	750	440	810	470	830	480
Reservation total	3,664	1,046	4,400	1,260	4,900	1,400	4,900	1,400	5,300	1,510	5,400	1,540
Ashland (on reservation)[b]	380	110	460	130	510	150	510	150	540	160	560	160
Birney (on reservation)[b]	145	40	170	50	190	50	190	50	210	60	210	60
Busby[b]	810	230	970	280	1,080	310	1,080	310	1,170	330	1,190	340
Lame Deer[b]	2,000	570	2,400	680	2,670	760	2,670	760	2,890	820	2,950	840

NOTE: Figures may not add due to rounding. Figures for 1980 are from actual census count except as noted. All population projections are based on the 1980 share of county population. All housing projections are based on the number of persons per house in 1980.

a. Includes the portion of the Crow Reservation in Yellowstone County, Montana. This portion was held constant for the projections.

b. Population figures for Ashland, Birney, Busby, and Lame Deer were taken from a statement of the Northern Cheyenne Tribe at the EIS scoping meeting in Ashland, Montana, on May 26, 1983. Housing figures are based on the average number of persons per house for the Northern Cheyenne Reservation in 1980.

TABLE 3-14
LOCAL EXPENDITURE LEVELS IN THE EASTERN AND WESTERN POWDER RIVER REGION
IN 1979, WITH PROJECTIONS FOR BENCHMARK YEARS
(in thousands of dollars)

	1979[a]	1985[b]	1987[b]	1988[b]	1990[b]	1995[b]
Campbell County	13,681.1	18,800	24,500	25,900	26,900	29,500
School District 1	35,885.2	49,300	64,200	67,900	70,600	77,300
Gillette	10,122.0	14,000	18,200	19,200	20,000	21,900
Converse County	8,304.0	7,800	9,900	10,300	10,500	11,000
School District 1	15,279.5	14,300	18,200	19,000	19,300	20,300
Douglas	6,690.0	6,200	7,900	8,300	8,400	8,800
School District 2	5,735.5	5,400	6,800	7,100	7,200	7,600
Glenrock	1,234.0	1,100	1,400	1,500	1,500	1,600
Crook County	3,467.4	3,600	3,700	3,800	3,900	3,900
School District 1	4,578.5	4,800	4,900	5,000	5,100	5,200
Sundance	546.3	600	600	600	600	600
Moorcroft	384.0	400	400	400	400	400
Goshen County	1,899.1	2,100	2,300	2,300	2,300	2,400
School District 1	7,780.9	8,600	9,200	9,400	9,500	9,800
Torrington	4,136.7	4,600	4,900	5,000	5,100	5,200
Johnson County	2,062.3	2,200	2,400	2,500	2,500	2,600
School District 1	5,646.8	6,000	6,500	6,700	6,900	7,100
Buffalo	1,902.3	2,000	2,200	2,300	2,400	2,400
Natrona County	35,668.5	39,400	41,800	42,400	42,900	44,300
School District 1	30,908.8	34,100	36,200	36,800	37,200	38,400
Casper	41,792.5	46,200	49,100	49,800	50,400	52,000
Niobrára County	889.0	900	1,000	1,000	1,000	1,000
School District 1	2,812.5	2,900	3,000	3,000	3,100	3,100
Lusk	1,465.4	1,500	1,600	1,600	1,600	1,600
Platte County	2,773.9	2,000	2,200	2,200	2,200	2,300
School District 1	6,564.4	4,800	5,100	5,200	5,300	5,500
Wheatland	3,147.0	2,300	2,500	2,500	2,600	2,600
School District 2	1,278.0	900	1,000	1,000	1,000	1,100
Guernsey	592.9	400	500	500	500	500
Sheridan County	14,724.3	16,600	18,100	18,700	19,700	20,200
School District 2	9,898.8	11,200	12,200	12,600	13,300	13,600
Sheridan	7,143.8	8,100	8,800	9,100	9,600	9,800
Weston County	3,806.8	5,100	5,300	5,300	5,400	5,500
School District 1	3,671.2	4,900	5,100	5,100	5,200	5,300
Newcastle	1,662.8	2,200	2,300	2,300	2,300	2,400
School District 7	1,307.0	1,800	1,800	1,800	1,800	1,900
Upton	1,341.4	1,800	1,900	1,900	1,900	1,900

a. Actual expenditures reported by local entities. Includes debt servicing.

b. Figures projected on a per capita basis from 1979 per capita expenditure levels.

TABLE 3-15
LOCAL EXPENDITURE LEVELS IN THE NORTHERN POWDER RIVER REGION
IN 1980, WITH PROJECTIONS FOR BENCHMARK YEARS
(in thousands of dollars)

	1980[a]	1985[b]	1987[b]	1988[b]	1990[b]	1995[b]
Big Horn County	6,109.5	6,900.0	7,800	7,400	8,600	8,600
Schools	9,892.3	11,200.0	12,600	11,900	13,900	14,000
Hardin	778.1	870.0	990	940	1,100	1,100
Powder River County	3,887.5	3,887.5	5,000	5,000	7,200	7,200
Schools	2,025.8	2,025.8	2,600	2,600	3,700	3,700
Broadus	162.3	162.3	210	210	300	300
Rosebud County	6,392.5	7,700.0	8,700	9,000	9,400	9,500
Schools	5,911.7	7,100.0	8,000	8,300	8,700	8,800
Ashland[c]	---	170.0	190	200	210	220
Colstrip	4,813.1	5,800.0	6,500	6,800	7,000	7,200
Forsyth	1,341.0	1,600.0	1,800	1,900	1,900	2,000

a. Actual expenditures reported by local entities. Includes debt servicing.

b. Figures projected on a per capita basis from 1980 per capita expenditure levels.

c. Ashland had no formal budgeting in 1980. Projections are based on average per capita spending of Broadus, Hardin, and Forsyth in 1980.

TABLE 3-16
LOCAL EXPENDITURE LEVELS IN 1980
ON THE CROW AND NORTHERN CHEYENNE INDIAN RESERVATIONS
WITH PROJECTIONS FOR BENCHMARK YEARS
(in thousands of dollars)

	1980[a]	1985[b]	1987[b]	1988[b]	1990[b]	1995[b]
Crow Reservation	6,474.8	7,300	8,100	7,700	8,900	9,000
Lodge Grass	87.0	100	110	100	120	120
Northern Cheyenne Reservation	7,011.5	8,400	9,400	9,400	10,100	10,300

a. Source: For Crow Reservation and Lodge Grass--Mountain West Research-North, Inc., "Decker Area Mines Comprehensive Social Sciences Study," 1983. Report prepared for Montana Department of State Lands and U.S. Office of Surface Mining. For Northern Cheyenne--paper submitted by the Northern Cheyenne Tribe, dated October 27, 1983, containing comments on a review edition of this document.

b. Projected on a per capita basis.

The Northern Powder River Region

The primary sources of funding for counties and schools in the Northern Powder River Region are property taxes and the gross proceeds tax. Montana communities receive funding from property taxes, water and sewage fees, other local use taxes, and grants.

Communities can also develop special improvement districts for major projects (sewer, water, streets). The Montana Coal Board receives an allocation of 8¾ of the Montana coal severance tax to provide grants for the purpose of alleviating impacts.

The Crow and Northern Cheyenne Indian Reservations

The primary sources of revenue for the Crow Tribe are mineral leases, permits, bonuses, and royalties.

The primary sources of revenue for the Northern Cheyenne are grazing fees, timber fees, investment income, private contributions, fees for mineral exploration, and federal assistance. The Northern Cheyenne Tribe emphasizes that these revenues are not reliable and have declined substantially in recent years. In addition, the tribe has emphasized the inadequacy of facilities and services on the reservation. Given the declining revenues, these inadequacies can only intensify at the cost of degrading the quality of reservation life.

Legislation recently enacted by the Montana state legislature allows the Montana Coal Board to allocate 7% of its funds for loans and grants to Indian tribes and state agencies beginning October 1, 1983. However, this only imparts the right to apply for loans or grants; it does not guarantee funding.

COMMUNITY SERVICES

This section presents estimates of community service levels that would be required for the projected populations in the Powder River Region for benchmark years. The estimates are based on the levels per thousand population that existed in 1979-1980. This is done in order to maintain the standards that existed in the base year. Where there was no existing service, estimates are based on a standard that is footnoted on the table. Tables 3-17 through 3-22 present community service requirements for the Eastern and Western Powder River Region; tables 3-23 through 3-28 present requirements for the Northern Powder River Region; and tables 3-29 through 3-34 present requirements for the Crow and Northern Cheyenne.

SOCIOLOGY

In this section, after the social environment of Wyoming and Montana counties is described, the Crow and the Northern Cheyenne tribes and reservations are covered independently as social units. Even though the land areas are relatively large and the reservations include several small towns in Big Horn and Rosebud counties, the different administrative, political, and cultural structure of these areas justifies their treatment as separate entities.

Each potentially affected community and tribe is then portrayed in terms of its relative capacity to absorb changes that would occur through coal leasing. The criteria used in making these judgments are presented.

Wyoming

Campbell County

The effects of coal mining in Campbell County have been extensive over the past decade. The total population reached 24,367 in 1980, up from 12,957 in 1970. Projections for 1985 population in the county and in the city of Gillette are 31,900 and 15,900, respectively. Some believe these populations were considerably higher by 1982; however, the recent recession and the current depressed state of energy production suggest more conservative projections for 1985. The only other significant population center in Campbell County is the town of Wright, 40 miles south of Gillette, which has an estimated 1980 population of about 1,300.

Campbell County and Gillette are industrial areas. About 48% of the total county employment in 1982 was in the mining (petroleum, coal, and uranium extraction) and construction sectors of the economy (Browne, Bortz, & Coddington 1983).

While Campbell County has experienced many growth management problems since the early 1970s, it is now in a solid position to absorb additional growth successfully. Except in mental health care and number of physicians, the city and county have reached a substantial capacity to absorb population growth.

TABLE 3-17
LEVELS OF COMMUNITY SERVICES
IN THE EASTERN AND WESTERN POWDER RIVER REGION, 1979-1980

County/Community	School Enrollment	Water Capacity (million gallons per day)	Sewage Capacity (million gallons Per day)	Law Enforcement (sworn officers)	Firefighters Full-time	Firefighters Volunteers	Hospital Beds
Campbell				25			
Gillette	4,570	3.6[a]	1.7[a]	31	5	22	31[b]
Converse				10			
Douglas	1,979	3.5	0.3[c]	10		30	31
Glenrock	1,172	1.5	1.5[d]	8		25	
Crook				4			
Sundance	479	0.6[h]	0.3[e]	5		15	16
Moorcroft	437	0.3[f]	0.14[g]	4		28	
Goshen				4			
Torrington	1,663	2.5[h]	i	13		40	56
Johnson				8			
Buffalo	1,392	3.8[h]	0.6[j]	7		17	35
Natrona				63			
Casper	13,559	26.0[h]	6 .5	117	95		282
Niobrara				2			
Lusk	574	2.2	0.3[k]	6		24	12
Platte				6			
Guernsey	413[l]	1.3	0.6[e]	7		34	
Wheatland	2,110	4.7	1.7[d]	12		70[m]	43
Sheridan				7			
Sheridan	3,352	10.0	5.0	29	18		97
Weston				5			
Newcastle	1,240	3.5	2.0	10		40	42
Upton	405	0.7	0.4[e]	5		25	

SOURCE: All data from Wyoming Department of Economic Planning and Development except where otherwise noted.

a. The city of Gillette now has an additional 10.1 million gallons per day (mgd) of water after completion of the Madison Project. In addition, a study has been undertaken to provide for construction of sewage treatment facilities with a 7.4 mgd capacity.

b. Expanding to 60 beds.

c. A new sewage system for Douglas is scheduled for completion by 1984.

d. Source: Glenrock Public Works Department

e. Estimate of 1979-1980 requirements based on 300 gallons per capita daily.

f. The town of Moorcroft hopes to buy water from the city of Gillette after the Madison project is completed.

g. The town of Moorcroft is seeking funding for improvement of sewage facilities.

h. Represents peak demand.

i. Torrington has sewage treatment facilities to serve a population of 6,000.

j. Sewage facilities for the town of Buffalo are to be rebuilt between 1981 and 1983.

k. Source: Lusk Water and Lights Department.

l. Source: Superintendent's office, School District 2, Guernsey, Wyoming.

m. Estimate of 1979-1980 requirement based on Casper District average of 12 volunteer firefighters per 1,000 population.

TABLE 3-18
ESTIMATED 1985 REQUIREMENTS FOR COMMUNITY SERVICES
FOR EASTERN AND WESTERN POWDER RIVER REGION
(based on 1979-1980 levels per 1,000 population)

County/Community	School Enrollment	Water Capacity (million gallons per day)	Sewage Capacity (million gallons per day)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Campbell				33			
Gillette	6,000	4.7	2.2	41	7	29	41
Converse				9			
Douglas	1,740	3.1	0.3	9		26	27
Glenrock	1,030	1.3	1.3	7		22	
Crook				4			
Sundance	490	0.6	0.3	5		15	16
Moorcroft	440	0.3	0.14	4		29	
Goshen				4			
Torrington	1,820	2.8	a	14		44	61
Johnson				8			
Buffalo	1,450	3.9	0.6	7		18	36
Natrona				67			
Casper	14,500	27.8	6.9	125	102		301
Niobrara				2			
Lusk	590	2.3	0.3	6		25	12
Platte				4			
Guernsey	290	0.9	0.4	5		24	
Wheatland	1,460	3.3	1.2	8		48	30
Sheridan				7			
Sheridan	3,600	10.7	5.3	31	19		104
Weston				7			
Newcastle	1,640	4.6	2.6	13		53	56
Upton	540	0.9	0.5	6		33	

a. Torrington has sewage treatment facilities to serve a population of 6,000.

TABLE 3-19
ESTIMATED 1987 REQUIREMENTS FOR COMMUNITY SERVICES
FOR EASTERN AND WESTERN POWDER RIVER REGION
(based on 1979-1980 levels per 1,000 population)

County/Community	School Enrollment	Water Capacity (million gallons per day)	Sewage Capacity (million gallons per day)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Campbell				43			
Gillette	7,800	6.1	2.9	53	9	38	53
Converse				11			
Douglas	2,210	3.9	0.3	11		33	34
Glenrock	1,310	1.7	1.7	9		28	
Crook				4			
Sundance	510	0.6	0.3	6		16	17
Moorcroft	460	0.3	0.15	4		30	
Goshen				5			
Torrington	1,950	2.9	a	15		47	66
Johnson				9			
Buffalo	1,580	4.3	0.7	8		19	40
Natrona				71			
Casper	15,400	29.5	7.4	133	108		320
Niobrara			0.3	2		26	13
Lusk	610	2.3		6			
Platte				4		25	
Guernsey	310	1.0	0.5	5		52	32
Wheatland	1,570	3.5	1.3	9			
Sheridan				8			115
Sheridan	4,000	11.8	5.9	34	21		
Weston				7			
Newcastle	1,690	4.8	2.7	14		55	57
Upton	550	1.0	0.5	7		34	

a. Torrington has sewage treatment facilities to serve a population of 6,000.

TABLE 3-20
ESTIMATED 1988 REQUIREMENTS FOR COMMUNITY SERVICES
FOR EASTERN AND WESTERN POWDER RIVER REGION
(based on 1979-1980 levels per 1,000 population)

County/Community	School Enrollment	Water Capacity (million gallons per day)	Sewage Capacity (million gallons per day)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Campbell				45			
Gillette	8,200	6.5	3.1	56	9	40	56
Converse				12			
Douglas	2,310	4.1	0.3	12		35	36
Glenrock	1,370	1.7	1.7	9		29	
Crook				4			
Sundance	510	0.7	0.3	5		16	17
Moorcroft	470	0.3	0.15	4		30	
Goshen				5			
Torrington	1,980	3.0	a	16		48	67
Johnson				9			
Buffalo	1,640	4.5	0.7	8		20	41
Natrona				73			
Casper	15,600	30.0	7.5	135	109		330
Niobrara				2			
Lusk	620	2.4	0.3	7		26	13
Platte				5			
Guernsey	310	1.0	0.5	5		26	
Wheatland	1,600	3.6	1.3	9		53	33
Sheridan				8			
Sheridan	4,100	12.1	6.1	35	22		118
Weston				7			
Newcastle	1,710	4.8	2.8	14		56	58
Upton	590	1.0	0.6	7		35	

a. Torrington has sewage treatment facilities to serve a population of 6,000.

TABLE 3-21
ESTIMATED 1990 REQUIREMENTS FOR COMMUNITY SERVICES
FOR EASTERN AND WESTERN POWDER RIVER REGION
(based on 1979-1980 levels per 1,000 population)

County/Community	School Enrollment	Water Capacity (million gallons per day)	Sewage Capacity (million gallons per day)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Campbell				47			
Gillette	8,600	6.7	3.2	58	9	41	58
Converse				12			
Douglas	2,350	4.1	0.4	12		35	37
Glenrock	1,390	1.8	1.8	10		30	
Crook				4			
Sundance	520	0.7	0.3	5		16	18
Moorcroft	480	0.3	0.15	4		31	
Goshen				5			
Torrington	2,020	3.0	a	16		49	68
Johnson				10			
Buffalo	1,680	4.6	0.7	8		21	42
Natrona				73			
Casper	15,800	30.3	7.6	136	111		329
Niobrara				2			
Lusk	630	2.4	0.3	7		26	13
Platte				5			
Guernsey	320	1.0	0.5	5		26	
Wheatland	1,620	3.6	1.3	9		54	33
Sheridan				9			
Sheridan	4,200	12.4	6.2	36	22		120
Weston				7			
Newcastle	1,730	4.9	2.8	14		56	58
Upton	560	1.0	0.6	7		35	

a. Torrington has sewage treatment facilities to serve a population of 6,000.

TABLE 3-22
ESTIMATED 1995 REQUIREMENTS FOR COMMUNITY SERVICES
FOR EASTERN AND WESTERN POWDER RIVER REGION
(based on 1979-1980 levels per 1,000 population)

County/Community	School Enrollment	Water Capacity (million gallons per day)	Sewage Capacity (million gallons per day)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Campbell				51			
Gillette	9,400	7.4	3.5	64	10	45	64
Converse				12			
Douglas	2,460	4.4	0.4	12		37	39
Glenrock	1,460	1.9	1.9	10		31	
Crook				4			
Sundance	530	0.7	0.3	6		17	18
Moorcroft	490	0.3	0.15	4		31	
Goshen				5			
Torrington	2,070	3.1	a	16		50	70
Johnson				10			
Buffalo	1,720	4.7	0.7	9		21	43
Natrona				76			
Casper	16,300	31.3	7.8	141	114		330
Niobrara				2			
Lusk	640	2.4	0.3	7		27	13
Platte				5			
Guernsey	330	1.0	0.5	6		27	
Wheatland	1,670	3.7	1.3	10		55	34
Sheridan				9			
Sheridan	4,300	12.7	6.4	37	23		124
Weston				7			
Newcastle	1,760	5.0	2.8	14		57	60
Upton	580	1.0	0.6	7		36	

a. Torrington has sewage treatment facilities to serve a population of 6,000.

TABLE 3-23
LEVELS OF COMMUNITY SERVICES
IN THE NORTHERN POWDER RIVER REGION, 1979-1980

County/Community	School Enrollment	Water Capacity (million gallons per day)	Sewage Capacity (million gallons Per day)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Full-time	Volun-teers	
Big Horn	2,393	---	---	16	---	23	50[a]
Hardin	---	4.0	b	c	---	20	---
Powder River	580	---	---	4	---	15	---
Broadus	---	0.5[d]	e	c	---	f	---
Rosebud	2,536	---	---	19	---	---	26
Ashland	---	g	g	c	---	---	---
Colstrip	---	h	i	c	---	27	---
Forsyth	---	3.5	0.5	c	---	16	---

SOURCE: Miles City District, BLM.

a. A 36-bed nursing home and a 20-unit retirement home are to be opened in 1983.
b. Hardin has sufficient capacity to accommodate a community of 6,000 persons.
c. Community law enforcement is provided by the county.
d. Based on three wells and pumping capacity of 345 gallons per minute.
e. Broadus has a three-cell lagoon of 7.72 acres. Only one cell is in use at present.
f. Firefighting services provided by the county.
g. Sewage and water systems were built in 1980 to accommodate a community of 2,500 persons.
h. Considered adequate for peak populationof 7,200. (Mont. DSL & U. S. OSM, DEIS for Rosebud Mine, 1983.)

i. Adequate to serve 7,500 persons.

TABLE 3-24
ESTIMATED 1985 REQUIREMENTS FOR COMMUNITY SERVICES
FOR THE NORTHERN POWDER RIVER REGION
(based on 1979-1980 levels per 1,000 population)

County/Community	School Enrollment	Water Capacity (million gallons per day)	Sewage Capacity (million gallons per day)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Big Horn	2,720	---	---	18	---	26	57
Hardin	---	4.5	a	b	---	23	---
Powder River	580	---	---	4	---	15	10[c]
Broadus	---	0.5	d	b	---	e	---
Rosebud	3,050	---	---	23	---	---	31
Ashland	---	f	f	b	---	3[g]	---
Colstrip	---	h	h	b	---	32	---
Forsyth	---	4.2	0.6	b	---	19	---

a. Hardin has sewage treatment capacity to serve a population of 6,000.

b. It is assumed that the county can continue to provide adequate law enforcement services.

c. Based on regional average of 4 beds per 1,000 population.

d. On the basis of usage in 1979-1980, it is assumed that the present three-cell, 7.72-acre lagoon would continue to be utilized at 1/3 of capacity.

e. It is assumed that the county can continue to provide adequate volunteer firefighting services.

f. Ashland has water and sewage capacity to serve a population of 2,500.

g. Based on regional community average of 6 volunteers per 1,000 population.

h. Colstrip has water capacity to serve a population of 7,200 and sewage capacity to serve 7,500.

TABLE 3-25
ESTIMATED 1987 REQUIREMENTS FOR COMMUNITY SERVICES
FOR THE NORTHERN POWDER RIVER REGION
(based on 1979-1980 levels per 1,000 population)

County/Community	School Enrollment	Water Capacity (million gallons per day)	Sewage Capacity (million gallons per day)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Big Horn	3,040	---	---	20	---	29	59
Hardin	---	5.1	a	b	---	25	---
Powder River	750	---	---	5	---	19	13[c]
Broadus	---	0.6	d	b	---	e	---
Rosebud	3,430	---	---	26	---	---	35
Ashland	---	f	f	b	---	3[g]	---
Colstrip	---	h	h	b	---	36	---
Forsyth	---	4.7	0.7	b	---	21	---

a. Hardin has sewage treatment capacity to serve a population of 6,000.

b. It is assumed that the county can continue to provide adequate law enforcement services.

c. Based on regional average of 4 beds per 1,000 population.

d. On the basis of usage in 1979-1980, it is assumed that the present three-cell, 7.72-acre lagoon would be utilized at less than 2/3 of capacity.

e. It is assumed that the county can continue to provide adequate volunteer firefighting services.

f. Ashland has water and sewage capacity to serve a population of 2,500.

g. Based on regional community average of 6 volunteers per 1,000 population.

h. Colstrip has water capacity to serve a population of 7,200 and sewage capacity to serve 7,500.

TABLE 3-26
ESTIMATED 1988 REQUIREMENTS FOR COMMUNITY SERVICES
FOR THE NORTHERN POWDER RIVER REGION
(based on 1979-1980 levels per 1,000 population)

County/Community	School Enrollment	Water Capacity (million gallons per day)	Sewage Capacity (million gallons per day)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Big Horn	2,890	---	---	19	---	28	60
Hardin	---	4.8	a	b	---	24	---
Powder River	750	---	---	5	---	19	13[c]
Broadus	---	0.6	d	b	---	e	---
Rosebud	3,560	---	---	27	---	---	37
Ashland	---	f	f	b	---	3[g]	---
Colstrip	---	h	h	b	---	38	---
Forsyth	---	4.9	0.7	b	---	23	---

a. Hardin has sewage treatment capacity to serve a population of 6,000.

b. It is assumed that the county can continue to provide adequate law enforcement services.

c. Based on regional average of 4 beds per 1,000 population.

d. On the basis of usage in 1979-1980, it is assumed that the present three-cell, 7.72-acre lagoon would be utilized at less than 2/3 of capacity.

e. It is assumed that the county can continue to provide adequate volunteer firefighting services.

f. Ashland has water and sewage capacity to serve a population of 2,500.

g. Based on regional community average of 6 volunteers per 1,000 population.

h. Colstrip has water capacity to serve a population of 7,200 and sewage capacity to serve 7,500.

TABLE 3-27
ESTIMATED 1990 REQUIREMENTS FOR COMMUNITY SERVICES
FOR THE NORTHERN POWDER RIVER REGION
(based on 1979-1980 levels per 1,000 population)

County/Community	School Enrollment	Water Capacity (million gallons per day)	Sewage Capacity (million gallons per day)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Big Horn	3,360	---	---	22	---	32	70
Hardin	---	5.6	a	b	---	28	---
Powder River	1,070	---	---	7	---	28	19[c]
Broadus	---	0.9	d	b	---	e	---
Rosebud	3,710	---	---	28	---	---	38
Ashland	---	f	f	b	---	4[g]	---
Colstrip	---	h	h	b	---	40	---
Forsyth	---	5.1	0.7	b	---	23	---

a. Hardin has sewage treatment capacity to serve a population of 6,000.

b. It is assumed that the county can continue to provide adequate law enforcement services.

c. Based on regional average of 4 beds per 1,000 population.

d. On the basis of usage in 1979-1980, it is assumed that the present three-cell, 7.72-acre lagoon would be utilized at less than 2/3 of capacity.

e. It is assumed that the county can continue to provide adequate volunteer firefighting services.

f. Ashland has water and sewage capacity to serve a population of 2,500.

g. Based on regional community average of 6 volunteers per 1,000 population.

h. Colstrip has water capacity to serve a population of 7,200 and sewage capacity to serve 7,500.

TABLE 3-28
ESTIMATED 1995 REQUIREMENTS FOR COMMUNITY SERVICES
FOR THE NORTHERN POWDER RIVER REGION
(based on 1979-1980 levels per 1,000 population)

County/Community	School Enrollment	Water Capacity (million gallons per day)	Sewage Capacity (million gallons per day)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Big Horn	3,390	---	---	23	---	33	71
Hardin	---	5.7	a	b	---	28	---
Powder River	1,070	---	---	7	---	28	19[c]
Broadus	---	0.9	d	b	---	e	---
Rosebud	3,770	---	---	28	---	---	39
Ashland	---	f	f	b	---	4[g]	---
Colstrip	---	h	h	b	---	40	---
Forsyth	---	5.2	0.7	b	---	24	---

a. Hardin has sewage treatment capacity to serve a population of 6,000.

b. It is assumed that the county can continue to provide adequate law enforcement services.

c. Based on regional average of 4 beds per 1,000 population.

d. On the basis of usage in 1979-1980, it is assumed that the present three-cell, 7.72-acre lagoon would be utilized at less than 2/3 of capacity.

e. It is assumed that the county can continue to provide adequate volunteer firefighting services.

f. Ashland has water and sewage capacity to serve a population of 2,500.

g. Based on regional community average of 6 volunteers per 1,000 population.

h. Colstrip has water capacity to serve a population of 7,200 and sewage capacity to serve 7,500.

TABLE 3-29
LEVELS OF COMMUNITY SERVICES IN 1979-1980
ON THE CROW AND NORTHERN CHEYENNE INDIAN RESERVATIONS

Reservation/Community	School Enrollment	Water Capacity (thousand gallons per day)	Sewage Capacity (surface acres)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Full-time	Volunteers	
Crow Reservation	a	---	---	15	6[b]	---	---
Crow Agency	a	900[c]	17	12	---	10	34
Lodge Grass	a	274[c]	12	2		10	---
Northern Cheyenne Reservation	a	---	---	15	6[d]	---	---
Ashland (on reservation)	420	72[c]	4	---	---	---	---
Birney (on reservation)	---	72[c]	2	---	---	---	---
Busby	218	144[c]	3	---	---	---	---
Lame Deer	a	360[c]	10	---	---	---	e

SOURCE: Miles City District, BLM.

a. Schools at these locations are county public schools. Enrollment levels for Big Horn and Rosebud counties are presented in table 3-23.

b. Part-time firefighters employed by the Bureau of Indian Affairs, U.S. Department of the Interior.

c. Water capacities are based on 625 gallons per minute (gpm) pumping capacity for Crow Agency, 190 gpm for Lodge Grass, 50 gpm for Ashland, 50 gpm for Birney, 100 gpm for Busby, and 250 gpm for Lame Deer.

d. In addition, there is a seven-member forest crew during the summer.

e. At present Lame Deer has an outpatient clinic, four doctors, and three ambulances.

TABLE 3-30
ESTIMATED 1985 REQUIREMENTS FOR COMMUNITY SERVICES
FOR THE CROW AND NORTHERN CHEYENNE INDIAN RESERVATIONS

County/Community	School Enrollment	Water Capacity (thousand gallons per day)	Sewage Capacity (surface acres)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Crow Reservation	a	--	--	17	7[b]	--	--
Crow Agency	a	1,000	19	13	--	11	38
Lodge Grass	a	310	13	2	--	11	--
Northern Cheyenne Reservation	a	--	--	18	7	--	18[c]
Ashland (on reservation)	510	90	5	1[d]	--	3[e]	--
Birney (on reservation)	--	84	2	0[d]	--	1[e]	--
Busby	260	170	4	1[d]	--	6[e]	--
Lame Deer	a	430	12	3[d]	--	14[e]	--

NOTE: Based on 1979-1980 levels per 1,000 population where existing; otherwise based on standards footnoted.

a. Schools at these locations are county public schools. Enrollment levels for Big Horn and Rosebud counties are presented in table 3-24.

b. Part-time firefighters employed by the Bureau of Indian Affiars, U.S. Department of the Interior.

c. Based on a regional average of 4 beds per 1,000 population.

d. Based on a regional average of 1.4 officers per 1,000 population.

e. Based on a regional average of 6 volunteers per 1,000 populations.

TABLE 3-31
ESTIMATED 1987 REQUIREMENTS FOR COMMUNITY SERVICES
FOR THE CROW AND NORTHERN CHEYENNE INDIAN RESERVATIONS

County/Community	School Enrollment	Water Capacity (thousand gallons per day)	Sewage Capacity (surface acres)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Crow Reservation	a	---	---	19	8[b]	---	---
Crow Agency	a	1,100	21	15	---	13	43
Lodge Grass	a	340	15	3	---	13	---
Northern Cheyenne Reservation	a	---	---	20	8	---	20[c]
Ashland (on reservation)	560	100	5	1[d]	---	3[e]	---
Birney (on reservation)	---	94	3	0[d]	---	1[e]	---
Busby	290	190	4	2[d]	---	6[e]	---
Lame Deer	a	480	13	4[d]	---	16[e]	---

NOTE: Based on 1979-1980 levels per 1,000 population where existing; otherwise based on standards footnoted.

a. Schools at these locations are county public schools. Enrollment levels for Big Horn and Rosebud counties are presented in table 3-25.

b. Part-time firefighters employed by the Bureau of Indian Affiars, U.S. Department of the Interior.

c. Based on a regional average of 4 beds per 1,000 population.

d. Based on a regional average of 1.4 officers per 1,000 population.

e. Based on a regional average of 6 volunteers per 1,000 populations.

TABLE 3-32
ESTIMATED 1988 REQUIREMENTS FOR COMMUNITY SERVICES
FOR THE CROW AND NORTHERN CHEYENNE INDIAN RESERVATIONS

County/Community	School Enrollment	Water Capacity (thousand gallons per day)	Sewage Capacity (surface acres)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Crow Reservation	a	--	--	18	7[b]	--	--
Crow Agency	a	1,100	20	4	--	12	40
Lodge Grass	a	330	14	2	--	12	--
					8	--	
Northern Cheyenne Reservation	a	--	--	20	--	3[e]	20[c]
Ashland (on reservation)	560	100	0.5	1[d]	--	1[e]	--
Birney (on reservation)	--	94	3	0[d]	--	6[e]	--
Busby	290	190	4	2[d]	--	16[e]	--
Lame Deer	a	480	13	4[d]			--

NOTE: Based on 1979-1980 levels per 1,000 population where existing; otherwise based on standards footnoted.

a. Schools at these locations are county public schools. Enrollment levels for Big Horn and Rosebud counties are presented in table 3-26.

b. Part-time firefighters employed by the Bureau of Indian Affiars, U.S. Department of the Interior.

c. Based on a regional average of 4 beds per 1,000 population.

d. Based on a regional average of 1.4 officers per 1,000 population.

e. Based on a regional average of 6 volunteers per 1,000 populations.

TABLE 3-33
ESTIMATED 1990 REQUIREMENTS FOR COMMUNITY SERVICES
FOR THE CROW AND NORTHERN CHEYENNE INDIAN RESERVATIONS

County/Community	School Enrollment	Water Capacity (thousand gallons per day)	Sewage Capacity (surface acres)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Crow Reservation	a	--	--	21	8[b]	--	--
Crow Agency	a	1,200	23	16	--	14	47
Lodge Grass	a	380	16	3	--	14	--
Northern Cheyenne Reservation	a	--	--	22	9	--	21[c]
Ashland (on reservation)	600	100	6	1[d]	--	3[e]	--
Birney (on reservation)	--	100	3	0[d]	--	1[e]	--
Busby	310	210	4	2[d]	--	7[e]	--
Lame Deer	a	520	14	4[d]	--	17[e]	--

NOTE: Based on 1979-1980 levels per 1,000 population where existing; otherwise based on standards footnoted.

a. Schools at these locations are county public schools. Enrollment levels for Big Horn and Rosebud counties are presented in table 3-27.

b. Part-time firefighters employed by the Bureau of Indian Affiars, U.S. Department of the Interior.

c. Based on a regional average of 4 beds per 1,000 population.

d. Based on a regional average of 1.4 officers per 1,000 population.

e. Based on a regional average of 6 volunteers per 1,000 populations.

TABLE 3-34
ESTIMATED 1995 REQUIREMENTS FOR COMMUNITY SERVICES
FOR THE CROW AND NORTHERN CHEYENNE INDIAN RESERVATIONS

County/Community	School Enrollment	Water Capacity (thousand gallons per day)	Sewage Capacity (surface acres)	Law Enforcement (sworn officers)	Firefighters		Hospital Beds
					Fulltime	Volunteers	
Crow Reservation	a	---	---	21	8[b]	---	---
Crow Agency	a	1,300	24	17	---	14	47
Lodge Grass	a	380	17	3	---	14	---
Northern Cheyenne Reservation	a	---	---	22	9	---	22[c]
Ashland (on reservation)	620	110	6	1[d]	---	3[e]	---
Birney (on reservation)	---	100	3	0[d]	---	1[e]	---
Busby	320	210	4	2[d]	---	7[e]	---
Lame Deer	a	530	15	4[d]	---	18[e]	---

NOTE: Based on 1979-1980 levels per 1,000 population where existing; otherwise based on standards footnoted.

a. Schools at these locations are county public schools. Enrollment levels for Big Horn and Rosebud counties are presented in table 3-28.

b. Part-time firefighters employed by the Bureau of Indian Affiars, U.S. Department of the Interior.

c. Based on a regional average of 4 beds per 1,000 population.

d. Based on a regional average of 1.4 officers per 1,000 population.

e. Based on a regional average of 6 volunteers per 1,000 populations.

There are various reasons for this level of capacity. Past experience with growth has prepared officials and citizens to respond effectively. Regulatory functions at the local level (Gillette Planning District, zoning, permitting) and the state level (Wyoming Industrial Siting Commission) are well established. City-county relations appear to be positive. Residents of the area historically have had positive attitudes toward development. There are no large ethnic or racial groups that are vulnerable to social change, and there are elaborate ongoing capital improvement programs at the county and municipal levels.

Gillette's social structure is diverse. More than 48% of the respondents to an extensive 1982 survey of citizens had lived in Gillette for five years or less (Browne, Bortz, & Coddington 1983). When this fact is considered, along with the city's size, it is understandable that Gillette's social atmosphere is relatively urbane. Gillette and the county have firm relations with state government and with several large corporations.

As discussed above, the area's population remains largely transient. This results in several types of community instability. The Campbell County crime rate over the past several years has been higher than Wyoming's as a whole (Wyo. Ofc. of Atty. Gen.). Statistics showthat the incidence of divorce and school dropouts is somewhat higher in this area than in the rest of Wyoming (McGowan 1983). Unemployment has been low over the past several years, but the area's dependence on energy extraction means that labor demand is volatile.

Gillette and Campbell County are therefore well prepared to respond to additional growth, even rapid growth of high magnitude (5 to 10% annually), at the community level. For existing and potential future residents, however, such changes would prolong the relatively high levels of disruptive behaviors and the lack of solidarity evident during the past decades.

The population of Gillette and Campbell County is expected to grow in the next decade or so, whether or not additional federal coal leasing takes place. This expectation is fueled by the belief that the demand for oil, gas, and coal remains relatively consistent. Energy production is the base of the economy in this area and will remain so well into the future.

The population of this area is quite large and diversified. Sound fiscal and service-facility conditions, along with a stable regulatory environment at the state and local levels, mean that both the city and the county are well equipped to deal with future growth. Improvements in community cohesion also should become evident through time as the population becomes less transitory and more stable.

Sheridan County

Sheridan County and the city of Sheridan have been moderately affected by coal development, both historically and in the recent past. However, most of the recent effects have been caused by mining on the Montana side of the state line, as Decker, Montana, area workers have chosen to live in the Sheridan area. Sheridan County's population increased from 17,800 in 1970 to 25,000 in 1980. This pace of increase, 3 to 4% annually, is almost exactly the same as that of Wyoming during the 1970s.

Roughly 80% of Sheridan County's residents live in Sheridan and in the fringe areas near the city. Other communities in Sheridan County are Ranchester, Dayton, and Story. Sheridan County is quite racially homogeneous; 98% of the population is white. The area's economy has shifted from an agricultural base to a services-mining base as coal production has increased in the Decker area.

Perhaps the preeminent issue associated with the effects of coal development on the Sheridan area is jurisdictional. Montana taxes on Montana production are not shared with Sheridan, the location of most social and economic effects. This is widely recognized as inequitable, but there appears to be no mechanism to alter the situation. Wyoming's industrial siting regulations do not apply to Montana operations, but Sheridan has implemented a subdivision review process. There is a planner-grantsperson, an industrial association, and a monitoring program to track socioeconomic change. These measures are assets to Sheridan and Sheridan County.

It is reported that Sheridan area residents typically support additional growth but want it to occur at a moderate pace (Mtn. West 1983). Sheridan residents, like those in other areas, apparently recognize that reliance on agriculture as an economic base is, over the long term, less than optimal for stability and growth. Additional diversification was evident in the rapid retail expansion that occurred in the 1970s, particularly in franchised operations.

The administrative-political environment also has changed. Sheridan lost some of its small-town atmosphere as growth management processes were implemented, the bureaucracy grew,

and the area became more urban. Coordination between the city and the county, and between those entities and the state, is generally well established.

While the mining employees from the Decker area may not have been particularly well integrated into the community, it appears that Sheridan absorbed the changes of the 1970s without widespread disruption. Examination of divorce, dropout, crime, and unemployment figures for the past several years reveal that these rates are comparable to or lower than those for Wyoming as a whole (McGowan 1983; Browne, Bortz, & Coddington 1983). This is evidence that, all things considered, the moderate increases in population during the past decade did not have a traumatic effect on the community and its residents.

Sheridan and Sheridan County are in a good position to deal with the moderate growth levels forecast for the next several years if no additional federal coal in the area is leased. As in Gillette and Campbell County, local economic dependence on energy production means there would be some vacillation in employment and expenditure levels through time. However, the economy of the Sheridan area is somewhat more balanced than that of the Campbell County-Gillette area. Radical shifts in social stability are not expected—the projected growth will be vigorous without being disruptive.

Montana

Rosebud County

The principal communities in Rosebud County that would be affected by federal coal leasing are Forsyth, Colstrip, and Ashland. Forsyth, the county seat, is on the northern edge of Montana areas that have been influenced by past and present production. Its population increased at a moderate pace through the 1970s (from roughly 1,900 in 1970 to 2,600 in 1980), largely because of construction activities at Colstrip. Ongoing public dialogue on the local benefits and costs of additional coal development has accompanied the development that has occurred south of Forsyth. It appears that the leadership in Forsyth has been quietly supportive of the changes while many of the ranchers in the county have been and remain vigorously opposed to coal mining and conversion. This has resulted in some polarization in Forsyth and Rosebud County (Hooper and Branch 1982).

Forsyth is moderately diverse economically, politically, and socially. The effects of Colstrip construction on Forsyth were lessened by the short time that newcomers lived there during the 1970s. Many did not stay long enough to have great influence.

Ties between Forsyth and the state of Montana appear well developed, as the Montana Coal Board has granted substantial funding to Rosebud County. Furthermore, the city historically has interacted extensively with the Burlington Northern Railroad and the Montana Power Company. Thus, Forsyth and the county are fairly well connected to higher levels of government and to corporate organizations. However, these linkages have not helped Forsyth toaddress a persistent problem, medical care.

The moderate growth that was mainly due to Colstrip activities during the 1970s did cause some expansion of local government and attendant growth of the bureaucracy. Nevertheless, Forsyth maintains a small town atmosphere, with most relations being personalized.

Colstrip, about 25 miles south of Forsyth, is the center of energy development in Rosebud County. It has been transformed during the past decade. Its population grew from about 200 in 1970 to roughly 3,200 in 1980 for the portion of Rosebud County that includes Colstrip. Inevitably this resulted in extensive changes. Unlike that of the rest of the county, Colstrip's economy and labor force are tied almost exclusively to industrial mining and conversion processes. Perhaps because the population has been largely transient, Colstrip residents have been described as apolitical. An effort to incorporate Colstrip as a municipality was defeated, so the community remains dominated by the Montana Power Company (Mont. DSL 1982b).

Given its size, Colstrip is quite diverse. Many "blue-collar" and managerial persons and families have settled in Colstrip either permanently or temporarily. Because few of them grew up in Rosebud County, there is low identification with local affairs or with long-term local residents. Cohesion in the town is considered low; this is predictable given the circumstances of Colstrip's change.

Colstrip's major assets are its relationship with the Montana state government and with Rosebud County. Because of the growth during the 1970s, Colstrip received a lot of attention from the Montana Coal Board and other state agencies, and from the county. Its share of Rosebud County's

population increased from about 3% in 1970 to more than 30% in 1980. State and county resources were funneled into Colstrip as it attempted to deal with the wholesale changes that took place.

Ashland is another unincorporated town in Rosebud County. Its location on the eastern edge of the county and the area's transportation network have prevented its being affected much by coal mining and conversion activity to the northwest at Colstrip or by mining to the southwest in the Decker area. The population of Ashland, estimated at about 400, appears to be stable. The economic base of Ashland is limited—it contains a Forest Service Office, Saint Labre Mission School, a sawmill that operates intermittently, and some small services and retail operations.

It is reported that Ashland lacks cohesion socially. Because of its proximity to the Northern Cheyenne reservation, the community has a sizable Indian population as well as non-Indian residents. For that reason it is somewhat fragmented. The community is very informal, but this has not facilitated collective action in the past. As a community, however, Ashland has developed better ties with Rosebud County and the Montana Coal Board than previously existed. This has been accomplished through the county planning board and by the development of a water-sewer board that applied for and received a grant from the Montana Coal Board (Hooper and Jobes 1982).

For Rosebud County as a whole, conventional indicators of social well-being do not reveal profound existing problems. Reported crime has been low relative to other counties in Montana as recently as 1981 (Mont. Bd. of Crime Control). The divorce rate has fluctuated but generally has been below the nation's rate during the 1970s. Unemployment has been relative to construction activity at Colstrip. A significant problem for residents of Rosebud County has been the persistent shortage of medical care, a chronic situation in many rural areas.

It is projected that Rosebud County will experience significant population growth through the late 1980s and early 1990s if no additional federal coal leasing takes place. This expected growth will occur in the main communities, Forsyth and Colstrip, where it will be due largely to in-migration. Growth to a lesser extent is expected on the Northern Cheyenne Reservation. Given the locations and magnitude of these potential increases, patterns of community social life should not be distrupted beyond systemic changes involving the larger society.

Powder River County

The community most likely to be affected in Powder River County is Broadus, the county seat. The establishment of the Belle Creek oil field caused a small boom in Broadus in the late 1960s and early 1970s. The county's population has been fairly stable for some time, ranging from 2,000 to 3,000. Roughly 700 of these persons live in Broadus.

Revenues generated by the Belle Creek field have generally enabled Powder River County to provide adequate services. The major deficits are in medical care and housing, neither of which is typically addressed by county or municipal government. Exhaustion of the Belle Creek field through time will require the county government to obtain alternative sources of revenue or to reduce the level of services.

Broadus, a small town with characteristics more or less typical of such communities, serves as a trade center for the surrounding rural agricultural area. It is very informal, and its economy is not highly diversified. Linkages to state government and corporate organizations are limited, but the recent appointment of a county commissioner to the Montana Coal Board should be helpful in establishing ties to an important potential source of revenue.

Land use planning efforts in Powder River County, driven by expectations that coal development would cause population increases, have not been favorably received. Given that there has also been some recent instability in Broadus government, it appears that rapid growth would require both city and county government to quickly implement some management processes that are not now available. However, there is willingness and openness to economic growth among community leaders. This reflects the general atmosphere in the town and in the county. There is ongoing opposition to coal development in Powder River County, but persons holding these views are reportedly a small segment of the population, mostly living in the western areas of the county (Myers, Davidson, and Trent 1983).

Review of crime, divorce, unemployment, and similar indicators of social problems reveals that general stability prevails in Powder River County.

In summary, Broadus and Powder River County, facing long-term economic decline and the absence of alternative means of broadening the economic growth base, generally appear favorable toward coal extraction in the county. However,

present capabilities to deal with the consequences of such activity are quite limited in comparison with other regional communities that have already experienced either moderate or large-scale growth.

The population of Broadus and Powder River County may grow considerably during the next decade, with Broadus being the focus of the changes during the late 1980s and early 1990s. Should this growth materialize, the area's social setting will be affected. Pressures on services and facilities will be evident as leaders try to keep pace with increased demands. Interpersonal relations will become more impersonal as newcomers, many with industrial occupations and without local ties, enter the area. The growth figures are not large in absolute numbers, but Powder River County is so sparsely populated now that even small numbers of newcomers can have a significant effect.

Big Horn County

The main communities in Big Horn County that would be affected by additional regional coal development are Hardin (the county seat), Crow Agency, Lodge Grass, Wyola, Busby, and Kirby. Busy is on the Northern Cheyenne Reservation, and Crow Agency, Lodge Grass, and Wyola are on the Crow Reservation. Historically, the county's population has been quite stable. About 11,000 persons lived in Big Horn County in 1980, and roughly one-half of them were either Crow or Northern Cheyenne. There has recently been a slight out-migration of non-Indians and a steadily increasing Indian population; thus, the Indian population now amounts to a higher proportion of the total than in the past.

Agriculture has been the keystone of the economy of Big Horn County, but agricultural employment decreased by almost one-half from 1960 to 1980. Increases in other sectors have compensated for these reductions. Big Horn County is in a solid position as to public revenues—it receives revenues from several large coal mining operations.

As in other southeastern Montana areas, the county is fragmented by its cultural diversity. The presence of two Indian reservations has meant that authority is often unclear and jurisdictional issues are seldom settled to the satisfaction of all parties. Further complicating this source of division is the fact that much land on the reservations, particularly the Crow Reservation, is held by non-Indians. Given the multiple jurisdictions, coordination of local response to issues is complex. Big Horn County has tried to develop a planning board, but the principal reason for its existence, population growth associated with energy development, has not materialized to a significant level (Mtn. West Rsch. 1983). Population increases associated with the Decker area mines in Big Horn County have taken place primarily in Sheridan and Sheridan County, Wyoming.

Indicators of well-being for Big Horn County are mixed. It has had low divorce and suicide levels, yet per capita income has been consistently lower than that of Montana as a whole, and unemployment levels have been consistently higher. Unfavorable economic conditions on the Crow and Northern Cheyenne reservation are doubtless responsible for these chronic local problems.

If there is no additional federal coal leasing, Big Horn County is expected to grow at a moderate pace. Much of the change is expected to occur on the Crow Reservation. In areas not included in either Indian reservation, the changes should be subtle, incidental, and not the source of major conflicts or issues.

The Northern Cheyenne

The Northern Cheyenne Indian Reservation occupies about 450,000 acres in Rosebud and Big Horn counties. The tribe has estimated the population of the two major settlements, Lame Deer and Busby, at 2,000 and 810, respectively (Northern Cheyenne Tribe 1983b). The villages of on-reservation Ashland (across the Tongue River from the Ashland discussed previously) and Birney, further south on the Tongue River (across the river from predominantly non-Indian Birney), also are significant population centers on the reservation. The rest of the reservation population lives in the country.

Relative to non-Indian communities, the Northern Cheyenne reservation is culturally homogeneous, even though the tribe estimates that 15% of the area's population is non-Indian (Northern Cheyenne Tribe 1983b). Traditional cultural values are strong on kinship, spirituality, and the natural environment. This is especially influential in such traditional villages as Birney (Mont. DSL 1982a).

There has been some oil and gas exploration on the reservation, but the tribe has opposed on-reservation coal extraction without tribal control. Tribal policy regarding off-reservation development is largely attached to the potential for tribal members to obtain employment and other benefits at mines and facilities within daily commuting distance of the reservation. If this potential cannot

be realized, it is likely that the tribe will oppose the proposed development. The tribe also expressed concern about air quality, water quality, tribal government operations, and maintenance of the existing culture. Making tradeoffs between economic development and cultural preservation is a continuing dilemma for the Northern Cheyenne Tribe and its members (Kroll 1983).

Given the absence of other economic development proposals, and with access to potential benefits, coal development in the vicinity of the Northern Cheyenne Reservation may present an opportunity for the tribe to address several pressing problems. Unemployment is chronically very high. The age structure of the population means that expansion of the potential labor force is inevitable. Alcohol abuse is apparently widespread.

The tribe is responsible for providing several basic services, but its funding is limited. The federal presence on the reservation is also evident, as the Indian Health Service (IHS), Bureau of Indian Affairs (BIA), Public Health Service (PHS), and other federal and Montana agencies are also providing services. Services provided are municipal services (BIA), health services (PHS and IHS), welfare and social services (state of Montana and BIA), community health representative (PHS and IHS), education (BIA), housing (HUD), and water (IHS) (Northern Cheyenne Tribe 1981). Thus, the tribe and other institutions share the responsibilities for responding to reservation social conditions. The tribe has reported that tribal liability is increasing as federal funds have diminished over the past several years.

Without economic development of some sort, the cycle of poverty now evident on the reservation will persist and probally will be aggravated in the future. An employment agreement with the Montana Power Company for designation of jobs for Northern Cheyenne has evidently been effective over several years in providing employment opportunities.

Northern Cheyenne Tribe representatives met with BLM representatives in May 1983 to discuss tribal concerns associated with possible federal coal leasing. The tribe said the EIS should address the potential effects listed below (Northern Cheyenne Tribe 1983b).

Effects of leasing on tribal government operations. Ability of the tribal government to respond to the potential changes brought on by leasing.

Effects of leasing on the Northern Cheyenne culture and homeland. The extent to which coal development in the vicinity could endanger the reservation as the homeland of the Northern Cheyenne.

Effects of leasing on reservation communities. Effects on reservation communities such as Lame Deer and Busby.

Effects on services and facilities on the reservation. How regional population increases could affect the tribe's provision of services and facilities, and how those effects could be mitigated.

Effects on public finance. The tribe felt the EIS should address the revenue and expenditure processes of the tribe and the reservation.

Effects on law and order. Effects on traffic and other potential law enforcement problems caused by leasing in the vicinity. Mitigation also should be analyzed.

Employment Opportunities. The tribe said that the EIS should consider the level of living of tribal members and the possibility of using employment preferences as a mitigating measure.

Potential population increases. The effects of population increases in the region, both on and off the reservation.

Mitigative measures. The tribe is particularly interested in the use of lease stipulations as a means of mitigating adverse effects on the tribe.

Adequacy of site-specific analyses. The tribe belives that site-specific analyses should be included in the regional EIS.

Maintenance tract treatment in the EIS. The tribe feels that development of maintenance tracts would result in increased production and new impacts.

The "no action" alternative, the need for leasing, and cumulative analysis in the EIS. The tribe belives that the "no action" alternative is misleading with regard to additional development, that additional leasing needs should be analyzed, and that cumulative impacts should be examined.

The future population on the Northern Cheyenne Reservation is forecast to be higher than the present level. This moderate growth, in concert with some form of economic development on or near the reservation that would generate jobs, could give the tribe and its members an opportunity to begin to address their prevailing substandard living conditions. However, the likelihood of this happening is quite low. Capital investment in the present and the forseeable future is very limited. For these reasons, there is likely to be no improve-

ment in chronic problems such as alcoholism, housing, education, unemployment, and health in the future.

Government policies and programs will vary, with attendant fluctuations in funding. These changes will have some consequences; however, without stable improvements in economic opportunity, the near-term and mid-term outlook for improving living conditions among the Northern Cheyenne is not good.

The Crow

The Crow Indian Reservation, west of the Northern Cheyenne, contains another indigenous Native American population in southeastern Montana. The reservation is very large, 2.25 million acres, but the tribe owns only about 350,000 acres. The rest is controlled by individual Crow, non-Indians, and the state of Montana. Most of the reservation is in Big Horn County, with part of Yellowstone County also within reservation boundaries. Principal Crow Reservation communities are Crow Agency, Lodge Grass, Wyola, Saint Xavier, and Pryor, all of which are quite small. Hardin is a major off-reservation city just north of the boundary.

Cultural homogeneity within the tribe is relatively high because of historical continuity. The Crow and their leaders, unlike the Northern Cheyenne, appear to be convinced that industrial development on the reservation and in the vicinity does not present a threat to the Crow culture. The Crow have encouraged development of coal resources on the reservation as a means of economic expansion (Amer. Ind. Tech. Svcs. 1983). The tribe also has an agreement with Westmoreland Resources at the Absaloka mine, which has led to the hiring of Crow employees (Pacifica 1982).

The Crow also are highly dependent on nontribal sources for basic services and facilities. The economy is not highly diversified, and with a young population causing future expansion of the potential labor force, economic development is critical. However, such proposals have been met with considerable internal controversy within the tribe. Crow government is democratic, and dissent is a fundamental part of the tribe's decision process. This leads to delays as the tribe establishes policy. It now appears, after several years of discussion within the tribe, that the Crow want to take advantage of coal extraction on the reservation as a means of presenting job opportunities to tribe members (Amer. Ind. Tech. Svcs. 1983).

The future of the Crow tribe and its members is tied to economic development in some form, as is that of the Northern Cheyenne. The Crow are open to coal development on the reservation, however. Should this occur, at least a segment of the population would benefit directly, and all tribal members would receive some monetary benefits or benefit from improved services and facilities.

The Crow population is expected to increase in the next decade. Further declines in living conditions should be expected unless employment opportunities keep pace. Reliance on shifting government programs carries the risk that artificial and temporary solutions will be applied to fundamental structural conditions. Such programs may not be conducive to long-term improvements. Therefore, genuine economic development represents a sounder approach, and energy development may be one of the very few potential sources of such development for the tribe.

Capacity of Communities to Absorb Change

This section summarizes the twelve factors that influence the ability of a community to respond to growth and change (Mtn. West 1982). Observations are made about each community in the Powder River Region.

History of Development

Substantial development has occurred near Gillette, Sheridan, and Colstrip. Forsyth and the Cheyenne have been moderately affected by Colstrip, as have Hardin and the Crow by mining at Westmoreland. Broadus has gone through the Belle Creek experience, but that was a decade ago, and the field is well removed from the city. Ashland is in the vicinity of change but little has actually happened there.

Cultural Characteristics

As Native American communities, the Crow and Cheyenne are inherently more vulnerable to harm from industrialization than are predominantly white communities. Forsyth, Broadus, and Ashland are characterized as having relatively large populations of long-term residents.

Population Size and Change

Gillette and Sheridan are the area's largest communities. The Crow and Cheyenne have sizable populations, but they are dispersed over large areas. Broadus and Ashland are simply small towns. Colstrip, Forsyth, and Hardin are intermediate.

Labor Force

Gillette, Sheridan, and Colstrip have relatively large industrial labor forces that may or may not be consistent with local labor demand at any particular time. Forsyth's labor force is intermediate because of Colstrip and the railroad. Because of the Montana Power Company agreement and Westmoreland, the Cheyenne, the Crow, and Hardin also have some labor that could respond to new development. Ashland and Broadus have limited industrial labor forces.

Facilities and Services

Colstrip would be in a better position to deal with growth if it were incorporated. The Crow and Cheyenne are largely dependent on other government entities. Otherwise, facilities and services are tied closely to population.

Local Regulations

The siting law in Wyoming is advantageous to Sheridan and Gillette, even though Decker development is not covered. Rosebud County has planning. Powder River County does not have organized planning; however, Broadus is incorporated. Colstrip has been tightly controlled even though it is unincorporated. The Crow and the Cheyenne have autonomy, but land use controls apparently are not feasible.

Leadership Experience

With a few exceptions, leadership experience parallels history of development. Colstrip apparently lacks formal, noncorporate leaders and stability even though its experience is extensive. Leaders at the county level in Big Horn County have had significant ongoing exposure to coal issues. Broadus and Powder River County are now represented on the Montana Coal Board, but they have not gone through recent growth. Even with changing leadership, the Crow and the Cheyenne have been involved in negotiation processes with companies.

Attitudes

Gillette and Campbell County have historically been very favorable toward development. Sheridan is more moderate. The Montana areas are mixed, with support in the towns and significant opposition in rural areas. The Crow are open to mining on-reservation. The present Northern Cheyenne policy is to exclude on-reservation coal development.

Economic, Social, and Political Diversity

The Crow and the Cheyenne are culturally and economically homogeneous. Gillette and Sheridan are relatively large and complex. The other communities fall between these extremes.

Linkages to Nonlocal Organizations

Gillette and Sheridan are well connected to state government and corporate organizations. Colstrip is linked to Montana Power and Forsyth to Montana Power and the railroad. The other Montana communities are more isolated, largely because of lack of development in the immediate vicinity. The Crow and the Northern Cheyenne have no experience in applying for Montana Coal Board funds.

Coordination

City-county-state coordination is high in Gillette and Sheridan. The Crow have much internal dissent, and the Northern Cheyenne are not closely associated with state-county government. Ashland lacks cohesion. Forsyth, Broadus, and Colstrip are intermediate.

Patterns of Interaction

Gillette, Sheridan, and Colstrip are relatively urban communities with established bureaucracies. Broadus, Ashland, the Cheyenne, and the Crow are personalized, small communities even though there are bureaucratic, professional presences on the reservations. Forsyth is in transition and Hardin is intermediate.

Conclusions

Consideration of the above leads to the following conclusions.

Gillette and Sheridan have a high capacity to absorb change. Colstrip, Forsyth, and Hardin are communities with moderate capacity to absorb change, and Broadus, Ashland, the Northern Cheyenne, and the Crow have limited capacity to absorb change.

The potential for widespread disruption, given similar levels of development and population growth, is lowest for the two Wyoming communities and highest for the communities with limited capacities.