CHAPTER 5

UNAVOIDABLE ADVERSE IMPACTS OF CUMULATIVE REGIONAL DEVELOPMENT

The following impacts would remain after application of the planning and environmental controls discussed in Chapter 3. Whether certain impacts (such as those related to visual resources or socioeconomics) are adverse is a matter of personal preference. To the long-time resident who cherishes a traditional life-style, change probably would be adverse. To new residents, and those interested in economic and urban development, signs of growth would likely be welcome.

By 1990, a total population increase of 21,614 in Campbell and Converse counties is expected over the 1978 level of 37,780. The following impacts would result; they would be felt most strongly in the municipalities of northeastern Wyoming: (a) annual operating budget shortfalls of $1 million in Douglas by 1985 and $50,000 in Glenrock and $25,000 in Moorcroft by 1990; (b) capital budget shortfalls of $7 million in Gillette by the early 1980s, $5 million in Douglas by 1985, and lesser amounts in smaller communities; (c) continued high housing costs and shortages of rental units would force many households to accept inadequate housing; (d) temporary shortfalls in health services, classroom space, numbers of teachers, police and fire protection, and water and sewer services— provision of additional facilities and manpower would depend on solution of budget problems; (e) unavoidable sociological impacts relating to family problems, child abuse, and mental health—these impacts would be felt particularly in Gillette, Douglas, and Moorcroft; and (f) loss of the traditional regional agricultural life-style.

Coal train traffic would be increased from 60 to 300 unit trains per week (one way) along the main regional rail routes by 1990. Coal traffic between Donkey Creek and Alliance, Nebraska averaged about 60 unit trains per week (one way) in 1978. Impacts of rail traffic, such as noise and delays at crossings, would be quadrupled by 1990. Predicted 1990 coal train traffic is approximately 62% more than present track capacity. Completion of the rail line from Donkey Creek to Orin Junction in mid-1980 would approximately double track capacity. However, by 1990 coal train traffic would amount to approximately 82% of track capacity; total (coal plus other freight) train traffic would approximately equal track capacity.

The number of registered motor vehicles in Campbell and Converse counties would increase from about 35,700 in 1978 to about 56,200 in 1990. Increased road use would mean increased maintenance costs and vehicle accident rates.

When aquifers are disrupted by mining, lowering of water levels would occur in the overburden, coal, and some deep aquifers in the vicinity of mines and would possibly dry up some springs and seeps while reducing streamflow in areas around mines. The extent of the cones of depression around the mined areas would depend on aquifer properties and time. Local areas in southeast Campbell County would change from groundwater recharge to discharge areas during the time of mining.

Water in aquifers which develop after reclamation would be of poorer quality than in the premining aquifers. "Water in spoils was found to be significantly more highly mineralized than natural groundwater in terms of total dissolved solids, calcium, magnesium, and sulfate,"according to Rahn (1976, p. 54). Such water may exceed levels recommended for drinking water and irrigation.

Municipal water use would increase from 7,030 acre-feet annually in 1978 to 11,100 acre-feet annually in 1990. Additional water use is anticipated for industrial uses such as secondary and tertiary oil recovery, uranium milling, and coal conversion, as well as for agricultural needs for irrigation and domestic water. Total water use in the region by 1990 is expected to reach 78,000 acre-feet annually, or an increase of 26,030 acre-feet annually over 1978 levels. Increased water use would affect mostly population centers. Short-term water shortages could occur until the need for the water is eliminated or alternate sources are found. Such shortages would be most likely in Douglas, Gillette, Moorcroft, and Newcastle and would range (without expansion of present treatment plants) from 300,000 gallons per day to 7.5 million gallons per day.

Water pollution, a combination of hundreds of possible contaminants, which may result from increased population and industry may have an indeterminate adverse impact on public health. Some of the factors which would affect the scale of the impact are the lag time between municipal growth and establishment of corrective municipal services, the proportion of the population increase which settles outside municipalities and along stream channels, and the tenacity with which environmental laws and regulations are enforced.

Erosion and consequently sedimentation within mine areas would be greatly increased. The potential sedimentation rate by 1990 is estimated at 340 acre-feet per year for the region, whereas the rate in 1978 is 160 acre-feet per year. Leachate from spoil piles and replaced over-

burden would reduce surface water quality (see Table R4-5). Only a small portion of these impacts would be felt beyond mine areas, unless very heavy storms (100-year floods) cause breaching of the catchments and settling ponds.

There would be unavoidable localized increases in sedimentation and loss of aquatic habitat resulting from the proposed mining and associated activities. Disruption of the shallow groundwater system would destroy some point-watering sources and lush forage (along streams and including possible alluvial valley floors) during mining. The loss of watering sources would discourage stock and wildlife grazing in the affected areas. Loss of aquatic habitat and point-watering sources is expected on 330 acres of pond (including wells, playas, and springs) and 49 miles of stream by 1990. Losses by 1978 amount to 110 acres of pond and 16 miles of stream.

The area of the region where the ambient total suspended particulate (TSP) concentrations would be most affected by coal mining is a strip approximately 22 miles long and 2½ miles wide in southeast Campbell County (Map 1, Appendix A). From 1980 to 1990, annual TSP concentrations are predicted to rise from 31 $\mu g/m^3$ to 40 $\mu g/m^3$, well below the Wyoming standard of 60 $\mu g/m^3$.

A slight increase of TSP concentration is expected to be caused by population growth in Gillette and emissions from Rawhide and Eagle Butte mines between 1980 and 1990. For most of this area, the TSP concentrations are expected to remain below the Wyoming ambient air quality standards. But, it is possible that the Wyoming 24-hour standard of 150 $\mu g/m^3$ may be exceeded in downtown Gillette. However, the national primary standard of 260 $\mu g/m^3$ would probably not be reached. The annual TSP concentrations around Moorcroft are predicted to increase 5 $\mu g/m^3$ between 1980 and 1990. The resultant TSP concentrations in 1990 of 30 $\mu g/m^3$ would be one-half of the Wyoming standard.

The average annual horizontal visibility away from mines and towns in the region is expected to remain near the regional baseline of 54 miles. In Gillette, the annual visibility is expected to decrease from 28 miles in 1980 to 22 miles in 1990.

The future air quality is compared to existing air quality using 1980 as the base year because of lack of air quality and emissions data for 1978.

Regionally, by 1990, all soil productivity would be lost an average of 8 to 10 years on 22,794 acres due to coal mining disturbance, or on a total of 59,403 acres for all regional development activities. These acreages represent .5% and 1% of the regional acreage respectively. Soil productivity on a total of 3,242 acres would be lost permanently due to housing developments. The disturbance of topsoil would lower to some degree the natural soil productivity by compaction, mixing natural soils, and through soil erosion.

Soil productivity on reclaimed areas (25,966 acres by 1990) would vary depending on soils types and reclamation practices on each project. Productivities may be reduced due to alteration of topsoil thickness, quality, salinity, alkalinity, acidity, or clay content. If these factors retard reclamation, erosion may increase. There would also be a reduction in productivity of stockpiled topsoil due to loss of seeds, roots, microorganisms, organic matter, and nutrients.

If a 25-, 50-, or 100-year flood occurred when mined areas were in the process of being reclaimed, an accelerated rate of erosion would occur, resulting in large amounts of soil loss and lengthening the time required for revegetation.

Wind and water erosion or contamination by spillage of toxic materials (such as oil or gasoline) would cause the loss of 5% to 10% of available topsoil material.

After disturbance and reclamation, vegetative species diversity would be lost. Vegetation on reclaimed land (25,966 acres by 1990) is expected to be dominated by grasses. Lack of diversity reduces stability of the vegetative community and the variety of wildlife it supports.

An indeterminate amount of vegetation would be impacted by dust fallout from development activity.

An estimated 3,981 animal unit months (AUMs—based on domestic livestock use where one cow equals one animal unit month) (or 0.2% of those available in the region) would be lost annually due to total regional development activities by 1990. A cumulative permanent loss of 9,726 AUMs (0.5%) would be sustained by this time period on 3,242 acres due to increased population needs (new house construction). Additionally, 2,060 acres of cropland (2.0% of the regional total) would be lost by 1990 from all development activities.

Expansion of residential areas and mine development would decrease the land base available for recreation, decrease wildlife habitat (and hence hunting opportunity), and interfere with sightseers' enjoyment of the natural landscape. Acreage disturbed and unreclaimed by 1990 would total 36,679, or more than twice that disturbed and unreclaimed in 1978.

Present recreation areas would have to meet the demands of increased population. Increased maintenance and repair costs would result. Resource damage may occur.

Conflicts between private landowners and recreationists would increase, probably resulting in further restriction of public access to and across private land.

The quality of the traditional "primitive"recreation experience would decline in the region due to increased population.

Wildlife habitat would be temporarily lost on 22,794 acres (.5% of the region) of coal mine disturbance, or on a total of 59,403 acres (1% of the region) due to total regional development activities. Approximately 3,242 acres would be indirectly and permanently affected by 1990 due to residential and other urban structures.

By 1990, 1% of the regional pronghorn population, 1% of the regional mule deer population, and unknown percentages of regional small game and game bird populations would be lost due to direct habitat destruction. Projected losses due to poaching and road kills could increase these losses to 5.8% of the pronghorn population, and 23.7% of the mule deer population by 1990.

Increased demand for big game hunting, along with reduced numbers of animals to hunt, would reduce the quality of sport hunting in the region. The increased

losses to poaching would make less game available for legal harvest. This would increase the competition for the remaining big game tags. The increased numbers of resident hunters would cause fewer nonresident permits to be sold in the region. This would cause a loss of income to the state wildlife agency, if hunting license fees are not adjusted.

Indirect loss of habitat carrying capacity would occur, most notably in a strip of land approximately 65 miles long and 2 miles wide (Map 1, Appendix A), where numerous new roads, fences, mines, railroad spurs, and powerlines would be built. By 1990, 1.7% of regional mule deer yearlong range, 2.7% of pronghorn yearlong range, and 2.6% of pronghorn winter-yearlong range would be directly or indirectly affected by various mines throughout the region. These impacts would range from direct habitat destruction to noise, increased human activity, harrassment, and fencing of unmined areas.

The loss of habitat diversity and special topographic features, such as cliffs, would be an unavoidable loss under current reclamation practices.

Expanded urban areas, service facilities, and new transportation and utility networks to serve the increased population and industrialization would be permanent intrusions in the characteristic landscape.

All mine pits, stripped areas, industrial structures, machinery, buildings, and support structures (power lines, railroad spurs, and access roads) would be visual intrusions in the characteristic landscape until abandonment and revegetation is complete.

Almost 2 billion tons of coal would be mined in the region by 1990. In addition, 5% to 10% of the coal would be lost because present mining methods and economics do not permit its complete recovery from overburden or partings.

All cultural resources within the region would be affected by increased vandalism and pothunting as the population increases. Surface indications of important buried sites might be lost. Significant information might be lost to the records of the region's prehistory.

Natural topography on 22,794 acres (.5% of the region) would be altered by coal mine pits and cuts and fills, and then reclaimed to unnaturally smooth contours. Replaced overburden would be unstable, tending to settle or shift over time. Even though general topography of the area can be restored, cliffs and abrupt breaks, presently a part of the topographic scene, cannot be restored. Additional topography on approximately 39,000 acres (.8% of the region) would be altered by coal conversion facilities, rail and power systems, other mineral development, and population growth.

The Buckskin Mine (site-specific action) is included as a part of the cumulative regional development impacts discussed above and represents 4.6% of the 22,794 coal mine acres analyzed.