

## CHAPTER III

### PROBABLE IMPACT OF PROPOSED ACTION

Construction of a 113-mile railroad between Gillette and Douglas, will cause environmental impacts along the line of construction. Movement of an estimated 15,000,000 cubic yards of cut and fill material along the main track and sidings, placement of an estimated 220 culverts, 18 bridges and overpasses, mining of 740,000 cubic yards of clinker material for use as subballast, construction of access roads, construction camps, reservoirs, drilling wells and other associated activities will affect various environmental components.

Primary and secondary impacts will occur from railroad construction. Primary impacts will take place onsite, in a linear fashion along and adjacent to the 2,400 acre railroad corridor. Secondary impacts will occur offsite and will be related to population increases associated with employment of construction workers and permanent personnel for railroad operations. By 1990 an estimated 2,700 increase in population will occur as a direct result of railroad construction and operation within the Eastern Powder River Coal Basin. Other offsite impacts will be related to coal exportation via the railroad to distant places such as Lansing and Council Bluffs, Iowa; Pueblo, Colorado; Amarillo and Cason, Texas; Muskogee, Oklahoma; and Redfield, Arkansas. Transportation of coal to these locations will impact air quality, transportation networks, and populations. If new facilities are built to handle the rail transported coal or if other modes

of coal transportation are contemplated, the environmental impacts of these facilities will be examined as appropriate under federal and state law.

A major secondary impact resulting from railroad construction within the Eastern Powder River Coal Basin is development and mining of the vast coal reserves. Coal development impacts are analyzed on a regional basis in Part I, and on a site specific basis in Parts III - VI of this statement.

Impacts analyzed here relate strictly to development of a single track, 113-mile railroad, with nine sidings, from Gillette to Douglas. Spur construction is considered part of mine development and is covered under Parts III - VI of this statement. Assuming precise scheduling, no mechanical failures and operating 365 days per year, the maximum capacity of this single track is estimated to be 48 trains per day (24 loaded and 24 empty). Based on projected coal exportation of 48 million tons per year by 1980 (24 trains per day), 68 million tons by 1985 (34 trains per day), and 93 million tons by 1990 (46 trains per day), the maximum capacity of the line would not be reached until 1990. However, in all practicality, allowing for mechanical problems, track maintenance, and staggered scheduling, the capacity will probably be reached sometime between 1980 and 1985. When this occurs and a second track is required, this portion of the environmental statement will need to be updated. However, provided the second track is located directly adjacent to the first track, the impacts, as analyzed here, will need only minor revision. Construction of a second tract would probably impact environmental components of soil, water, vegetation and agriculture more than the others.

#### Air Quality

Construction of the proposed rail line, involving disturbance of 2,400 acres during removal and hauling of approximately 15 million cubic yards

of embankment, will create dust and wind blown particulate matter which will reduce air quality of the basin. Carbon monoxide and nitrogen oxide emissions from the various types of equipment (bulldozers, scrapers, rollers) used in construction activities will be increased in the immediate area of construction. Additional dust and particulate matter will be added to the atmosphere as result of construction of associated facilities such as access roads, powerlines, and construction camps. Burning of right-of-way material (grass, shrubs) will add pollutants to the air.

Besides the dust created by human activities, the constant and sometimes high winds experienced in this area will create additional dust and wind blown dirt particles from the exposed fine grained soils and parent materials. Dust will be produced along haul roads, access roads, fill areas, cut areas, borrow pits and from mining of clinker deposits for subballast.

Air quality will be reduced for an approximate period of two years as a result of construction activities. Some dust will be created by wind action for a longer period of time or until all disturbed areas are revegetated. Some of the steeper and deeper cuts may never be revegetated and will remain as a constant source of wind created dust and soil particles. Reduction in air quality will be localized to the immediate vicinity of the rail line construction. Where construction takes place near Highway 59, wind blown dust could reduce visibility and may increase probability of traffic accidents during periods of high wind.

Train emissions and coal dust created by loading facilities will cause long term impact on air quality. Each unit train (five diesel units and 110 cars) consumes an estimated 4,873 gallons of fuel per trainload of coal. Assuming an average load of 11,000 tons per train, the 1980 exported

coal production (48 million tons) would require 4,364 trainloads and combustion of 21.3 million gallons of diesel fuel. The estimated annual emissions resulting from burning this amount of fuel is: 266 tons of particulates; 606 tons of sulfur dioxide; 3,937 tons of nitrogen oxides; 1,383 tons of carbon monoxide; and 1,000 tons of hydrocarbons (Environmental Protection Agency 1973, Table 3.2.2-1).

Forty one million gallons of diesel fuel will be required by 1990 to export 93 million tons of coal. The estimated annual emissions resulting from burning this amount of fuel are: 513 tons of particulates; 1,170 tons of sulfur dioxide; 7,597 tons of nitrogen oxides; 2,669 tons of carbon monoxide; and 1,930 tons of hydrocarbons.

The impact of these emissions on air quality levels is indeterminate. Because of strong winds and dilution effect, air quality degradation is not expected to be serious. However, these emissions will add to the overall decrease in air quality.

Minor long-term impacts on air quality will result from use of access roads to maintain the rail line and frequent accidental wildfires started by train operations (10 to 50 per year).

## Topography

Major impacts to the existing topography will occur along the 113-mile, 2,400-acre right-of-way corridor. The topography along this linear area will be changed by moving an estimated 15,000,000 cubic yards of cut and fill material. Based on a maximum one percent grade, fills will vary from three feet high to a maximum of 85 feet. Cut depths will vary with a maximum depth of 102 feet occurring. Of the total length, 1.5 percent (1.7 miles) will be in cuts greater than 40 feet deep and 1.6 percent (1.8 miles) will be on fills greater than 40 feet high.

Cutting operations could remove prominent points of land and will create steep, unnatural slopes in areas where none existed before. Long fill slopes, which will be located in areas of low topographic relief, will create unnatural, elevated embankments. Minor drainages will be blocked by roadbed embankments, which will alter stream characteristics. Some drainages may be consolidated by diversion ditches to direct water flow into culverts and other drainage structures. The diversion ditches and cessation of flow in some channels will alter and create new topographic forms and shapes.

Major drainage channels may have to be altered to protect bridge abutments and embankments. Other drainage channels may need to be modified to accommodate the grade and curvature of the roadbed. Possible modification of major drainage channels may occur at the Belle Fourche and Cheyenne River crossings, and the Antelope, Lightning, Shawnee, Caballo, Coal, Little Thunder and Walker Creek crossings. These modifications all represent a change in existing topographic characteristics. Besides having a direct impact at the site of modification, these changes may increase or alter stream velocity. They could cause increased erosion and headcutting of

the streams, creating new and deeper channels and topographic changes many miles upstream or downstream from the point of the primary impact.

Impact on topography will also result from opening of an unspecified number of clinker pits along the northern 75 miles of the proposed route to obtain the estimated 740,000 cubic yards of clinker required for subballast. An indeterminable amount of sand and gravel will be required for construction of concrete structures such as road bridges and underpasses. Part of the gravel will be obtained from existing gravel pits located at the Irvine siding. An estimated requirement of 311,000 cubic yards of top ballast will be obtained from the limestone quarry located at Guernsey, Wyoming. Extracting these materials from the gravel pit at Irvine, river and creek bottoms, the Guernsey quarry, and new clinker pits, will cause additional alterations of the topography. Borrow areas for supplying fill and waste disposal areas for disposing of unsuitable excavated material will be required. All of these actions will create depressions or steep slopes where none existed before. Obtaining the necessary material along the right-of-way will affect 1,500 acres in addition to the 2,400 acres within the right-of-way.

Alteration of topography on 3,900 acres represents approximately one-tenth of one percent of the regional area being considered for coal development. Viewed on an areawide basis, the topographic impact is not significant. However, the impact will be severe along the railroad corridor.

## Soils

Impact on soils will result from disturbance of 2,400 acres within the right-of-way; removal of 1,100 acres from productivity by a cover of ballast, track, steep slopes, bridges, etc.; digging, moving, hauling of approximately 15 million cubic yards of soil material; compaction of topsoil and lower horizons by equipment; increased erosion from removal of vegetation, and deep cuts exposing fine grained soil and parent material; construction of access roads and construction camps; mining and removal of 740,000 cubic yards of clinker and material for use as subballast; and development and removal of soil from borrow pits along the right-of-way. The majority of these impacts will occur over the two-year span required for construction. The removal from productivity and exposure of soil to wind and water erosion on unvegetated steep cut slopes will be permanent impacts. Soil properties and characteristics which will be impacted are: erosion, sediment yield, soil moisture relationships, infiltration rates, available water holding capacity, permeability, bulk density, bearing capacity, soil structure, soil texture and chemical composition.

Table 1 provides the acreages to be disturbed and lost to productivity by soil associations. Map 7, Appendix A, shows the soil associations and a description of each is located in Part I, Chapter IV, of this impact statement.

Table 1

Acreege of Soil Associations Disturbed and Removed from Productivity  
by Railroad Construction within the Right-of-way

<u>Association</u>	<u>Acres Disturbed</u>	<u>Acres Permanently Removed</u>
1	50	23
3,5,8	50	23
11	975	447
13	150	69
14	440	202
20	735	336
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Total	2,400	1,100

Surface disturbance will destroy present topsoil characteristics and microorganisms and will impact runoff and permeability rates. Permeability will be reduced and runoff increased, adding to existing sediment load of the various drainages crossed by the right-of-way. Productivity levels will be lowered until the soil has had time to reestablish its various structural and microorganism relationships.

Handling and disturbing 15 million cubic yards of soil material in cuts and fills will completely disrupt and destroy the present soil horizon relationships which have been established over a long geologic time span. All of the soil characteristics described above will be affected. Material which may be toxic (sodium chloride, sodium sulphate, magnesium sulphate and calcium sulphate) to plant growth could be brought to the surface and create revegetation problems. Erosion and sedimentation will be increased as permeability is decreased. Soil structure and texture will be completely destroyed. The end result of this action could result in formation of new soils with characteristics and properties completely unrelated to the present soils.

Compaction impacts will not be confined to the right-of-way proper. Use of access roads and movement of equipment into and out of the right-of-way will cause compaction on a wider area. Compaction will affect infiltration rates, permeability and available water holding capacity. These impacts will last beyond the two-year construction period and could affect vegetation growth and will affect runoff and sedimentation rates. The natural soil development process will be affected and set back in development to a prior, less developed stage.

Construction of bridges and placement of culverts and other types of drainage structures will require permanent and/or temporary alteration of natural drainage channels. Some major drainages to be crossed by the proposed right-of-way beginning at the north terminus are Caballo Creek, Belle Fourche River, Coal Creek, Little Thunder Creek, Porcupine Creek, Antelope Creek, Dry Fork Cheyenne River, Dry Creek, Box Creek, Lightning Creek and Shawnee Creek. These alterations will concentrate excessive amounts of water into one channel or area and deprive stream bottoms and drainageways of their natural amounts of water where streams are rechanneled or channels merged. The alteration of surface and subsurface soil moisture requirements has a direct long term impact on the natural soil development process and related soil-climatic-vegetation environment. The concentration of water in drainageways will accelerate soil loss and sedimentation.

Offsite impacts created by excavation of ballast and subballast material sites, development of disposal areas for liquid and solid wastes, construction of reservoirs to provide a source of water and control surface runoff or flooding, construction of work camps, equipment storage areas, construction of spur rail lines, access roads, service roads and power lines will impact approximately 1,500 acres, outside of the right-of-way.

Nearly 550 acres will not be reclaimed nor revegetated because of permanent structures.

A total of 3,900 acres of surface soil will be affected by railroad construction. This represents approximately one-tenth of one percent of the total surface soil area within the Eastern Powder River Coal Basin. The impact on soils from railroad construction, outside the right-of-way corridor is not considered to be significant.

## Mineral Resources

Construction of the railroad will impact mineral resources in the area of construction as well as outside the right-of-way. The proposed route crosses an estimated 161 million tons of coal strippable under economic conditions of 1974. The route crosses an additional 195 million tons of coal covered by less than 400 feet of overburden.

Even though location of the railroad over coal will not cause a physical loss of coal resources, it can cause a deferral loss and inconvenience. When the adjacent coal is mined, a pillar of coal will have to be left to support the rail line. Some of the bypassed coal might be more expensive to mine or even economically nonrecoverable at that time.

Construction of the railroad through clinker deposits will cause an impact. The major impact on these deposits will result from the use of approximately 740,000 cubic yards for subballast material and an indeterminable amount for backfill, base material for structures, road surfacing, overpasses, underpasses, etc. Use and acquisition of clinker will impact soils and vegetation outside the right-of-way. The total area affected from this use is indeterminable. The estimated 311,000 cubic yards of top ballast required will be obtained from the Burlington Northern's Guernsey quarry located 40 miles southeast of Douglas. Use of this material will further deplete the availability of ballast for use on other projects. An undetermined amount of sand and gravel will be used in construction of six underpasses and overpasses. This material will probably be obtained locally from streambeds and banks and could affect water quality and fish life. The rail line construction will not impact any oil and gas operations. The right-of-way is not expected to cover or cause any measurable impact on uranium bearing material.

waters through percolation. Herbicides and their carriers used on maintenance of the right-of-way for selective vegetation control may be carried into ground water aquifers by percolation of surface waters. These contaminants would adversely affect ground water quality.

Surface waters of intermittent and ephemeral streams (Caballo Creek, Belle Fourche River, Coal Creek, Little Thunder Creek, Dry Fork Cheyenne River) crossed by the route may be adversely affected during construction of embankments and the installation of pilings, 12 bridges, and an estimated 220 culverts. Disturbed soils and open excavations will be subject to erosion should high intensity rainstorms occur during construction. This erosion would increase dissolved solids, turbidities and sediment concentrations in perennial, intermittent or ephemeral flows. Installation of drainage structures during periods of streamflow may increase turbidities if equipment is permitted to operate in the stream channel. Increased turbidities and sediment loads may also result from blockage and diversion of small drainages to adjacent major drainage structures. This would be caused when improper diversion structures increase erosion along diversion channels, and also in downstream channels due to larger than normal volumes of water. Abandonment or spills of oils, chemicals, sanitary wastes and other construction materials may occur, and these could add pollutants to streams from surface runoff. Herbicides used in selective control of right-of-way vegetation may be accidentally spilled, applied to, or carried into streams and would cause water pollution. Coal train accidents could cause accidental spilling of diesel fuel and coal into surface waters and drainages. Other rail traffic accidents could also spill cargo containing toxic materials into surface waters and drainageways. Extraction

of sand and gravel from stream bottoms for construction purposes would cause increased turbidities and may increase sediment transport due to accelerated erosion.

## Vegetation

Vegetation will be totally or partially removed on approximately 2,400 acres along the 113 mile right-of-way during the two-year construction period. Included in this acreage are 2,225 acres of big sagebrush/grass, 125 acres of greasewood, and 50 acres of broadleaf forest. Additional vegetation destruction outside the right-of-way would occur where embankment and clinker borrow areas are cleared during construction activities; access roads are built; staging areas and campsites are established; and where additional population associated with the railroad settles. Other vegetation would be damaged during construction of the project from off-road vehicle and equipment use on areas adjacent to the right-of-way. Construction of right-of-way fences will damage and remove varying amounts of vegetation.

Increase in population associated with construction and operation of the railroad will result in additional damage to and loss of vegetation. It is estimated that the following cumulative amounts of vegetation will be lost as a result of population increases: 95 acres by 1980; 124 acres by 1985; and 141 acres by 1990. Increased recreational use originating from this population will result in additional, indeterminable amount of damage to the vegetative resource within the study area. Most of the damage outside of the right-of-way would occur to the big sagebrush community and is estimated at 1,500 acres.

Construction and maintenance of fire guards for prevention of range fires would destroy up to 350 acres of big sagebrush/grass vegetation. Range fires started accidentally by railroad or related operations may burn from 200 to 3,000 acres per year of sagebrush/grassland vegetation adjacent to the right-of-way. Of the total 3,900 acres of vegetation disturbed, an

estimated 42 percent (1,650 acres) will be permanently lost to facilities such as the roadbed, ballast, siding tracks, steep cut slopes which do not readily adapt themselves to revegetation, fire guards, population increases, and access roads.

Minor adverse effects to vegetation may occur along the railroad embankment where minor drainage areas are intercepted and diverted through major drainage structures. This damage will occur from inundation of vegetation on the upstream side of the right-of-way and from elimination of soil moisture normally supplied by flood irrigation on the downstream side of the embankment.

The use of herbicides to control certain types of vegetation along the right-of-way would damage target plant species as well as some non-target species. Wind drift off target areas could cause additional vegetative damage.

## Archeological and Paleontological Values

Since a detailed archeological and paleontological survey of the proposed railroad right-of-way has not been conducted, it is difficult to analyze the impact of railroad construction on these scientific values. There will be 2,400 acres involved in the right-of-way and 1,500 acres disturbed outside of the right-of-way for borrow areas, subballast, access roads, campsites, etc. If sites do exist they will be destroyed. Construction of the proposed route will involve disturbing an estimated 15 million cubic yards of dirt. Several deep cuts (up to 102 feet deep) and fills (three to 85 feet deep) will occur. The cuts will destroy any archeological or paleontological values which may exist in the area. The fills will cover any potential archeological sites, making them unavailable for future study and salvage.

Besides the direct impact that railroad construction will have on any of these values which may be located in the area, indirect impacts will occur. The indirect impacts will be associated with the population increase expected to be generated by construction and operation of the railroad. Increased population will permanently remove and disturb additional acreage (141 acres by 1990) which could possibly contain archeological values. Recreational use associated with this population will impact known as well as unknown archeological sites throughout the study area. Arrowhead hunters, rock collectors, pot hunters and off-road vehicle users will all disturb additional surface acreage, destroying evidence which could provide information on archeological sites.

## Historical Values

Construction of the railroad will not create any impacts on historical sites or values.

## Aesthetics

Construction of the proposed railroad between Gillette and Douglas will impact existing elements (texture, lines, color, landform, intrusion) which collectively make up the visual resource (aesthetics).

Removal of vegetation in a linear strip, over 2,400 acres will impact the existing texture of the area (texture here consisting of a vegetative pattern). The removal of vegetation, fills and deep cuts created by the railroad will create a new vegetative texture. Part of the area will remain barren (1,100 acres of roadbed and 550 acres outside of the right-of-way), the remainder will be reclaimed with a different type of vegetation. These two results will change the existing texture. Reclamation, if successful, will produce a grass cover, with a height generally lower creating a contrasting texture with native vegetation outside the right-of-way.

The railroad will result in a sharp line across the landscape. Most lines in nature are not sharply defined but rather take a soft, irregular shape. The line created by the railroad will appear unnatural and contrast with natural lines in the area.

The natural color scheme of soft grays, greens and browns present in the area will be altered. The railroad will introduce a long, narrow band of different colors throughout the length of the line. The major contrast and impact will result from using the red colored clinker for a subballast. The rail line and unvegetated areas will also add different colors to the natural color scheme. The revegetated areas will add to the contrast of colors by the differing color of introduced vegetation with that of the surrounding native vegetation -- a mixture of various grasses, shrubs and brush.

Impact on existing landform will be caused by the cuts and fills. Some of the cuts will range in depth to 102 feet. These will create a

new shape of landform in contrast with the natural landform. An estimated 15 million cubic yards of soil will be moved by railroad construction, so numerous cuts and fills will be required. Since the railroad, and required structures (bridges, culverts) generally have a low profile, the railroad will not have a significant impact on the natural landscape.

Any vertical structures which may be required by the railroad, such as powerlines or buildings along the right-of-way, will cause an impact. An intrusive impact will result whenever a train passes a viewer travelling this route. This impact will be compounded as the daily train frequency increases as a result of expanding coal production.

The major impact on the aesthetic quality of the landscape will occur in the stretch between the Amax spur line and a point just north of Bill (approximately 30 miles) where the proposed route joins roads in the Hilight Oil Field. This part of the area has had few disruptions and disturbances from construction of roads, powerlines, etc. The landscape along this part of the line is still in a natural state.

The impact on aesthetics from that portion of the line lying adjacent to Highway 59 will not be as great. This area has already been disturbed and developed as a utility corridor. Some impact may occur as a train blocks a highway traveler's view of the surrounding area.

## Wildlife and Fish

Construction of the proposed railroad will result in removal or disturbance of up to 3,900 acres of big sagebrush and grass. Approximately 1,650 acres will be permanently removed from all types of aquatic or terrestrial habitat production. The area permanently removed will be occupied by railbed, ballast, slopes, access roads, fire guards and housing associated with the increased population induced by construction and operation of the railroad.

Fires caused by train operations and maintenance projects such as brush burning will retard re-establishment of habitat along the right-of-way. Habitat will also be destroyed or damaged by periodic fires off the right-of-way. Range fires started accidentally by railroad or related operations may burn from 200 to 3,000 acres of sagebrush/grassland habitat per year.

Train-animal collisions will occur despite right-of-way fencing. This will cause an indeterminable annual loss of all species.

There will be numerous specific biological impacts. Where the railroad crosses a stream, riparian habitat will be destroyed, particularly during construction activities. Box Creek and Porcupine Creek have well developed riparian "marsh" vegetation which could be destroyed by construction activities. Segments of other major streams that are crossed by the line (Shawnee Creek, Dry Fork of the Cheyenne River, Antelope Creek and the Belle Fourche River) have lesser amounts of riparian habitat which could be destroyed. Secondary impacts on downstream fish populations may result from sedimentation resulting from disturbance of 15 million cubic feet of material during construction activities.

### Threatened species

No significant impact on peregrine or prairie falcons is anticipated. No impact on prairie dog towns is anticipated. The town in closest proximity to the railroad route (1¼ miles) is located near the Little Thunder Reservoir, while the next closest town lies approximately five miles from the railroad and no others were observed along the proposed railroad route (VTN, BN/CNW, Environmental Impact Analysis, 1974). However, the destruction of any prairie dog colonies could affect black-footed ferrets either directly or by reducing their food supply.

### Big game

Approximately 25 percent, or 975 acres, of the total disturbed area is crucial antelope winter range. The proposed route also passes through summer and year long use areas of which construction will disturb 2,925 acres. The total impact of the action will result in an estimated loss of 75 antelope and loss or serious impairment of 3,900 acres of antelope habitat.

An estimated three deer per section of habitat rates the proposed route as a low concentration area. Approximately 1,200 acres of deer habitat will be lost or significantly disturbed. An estimated 10 to 20 deer will be lost through habitat disturbance and other factors including fencing and collisions.

Construction of the railroad, accompanied by intensive human activity during construction and later with use and maintenance of the route, and increasing human populations will force most deer and antelope away. Other impacts such as accelerated poaching by transient labor will result in higher mortality of deer and antelope.

In all probability the right-of-way will be sheep-tight fenced. Extensive use of culverts, bridges, and "cattle passes" would be utilized. Approximately 220 culvert sites, 12 bridge sites, and several cattle passes would be installed along the route. Some of these structures, although physically capable of allowing deer and antelope passage, should not be anticipated to be particularly effective for this purpose due to behavioral characteristics of both species. If the railroad is fenced to be "sheep-tight," with the exception of the bridges it could become a 113-mile barrier to antelope movement and, to a lesser degree, deer movement. The 3,900 acres directly affected by the railroad will be seriously reduced in value as deer and antelope habitat.

Lands occupied by the railroad and any needed access roads will be totally lost as available big game habitat. Resultant "grasses-only" rehabilitation efforts will not satisfy basic habitat requirements of antelope or deer.

#### Other mammals

##### Predators

Human activity will cause predators to avoid the railroad during construction. Coyotes, red foxes, and bobcats will experience few immediate impacts due to their wide ranging nature. Species such as raccoons, striped skunks, and badgers are less mobile and flexible. Direct habitat removal will initiate a decline in these species. Operation of the railroad will have a minor overall impact on predators.

##### Rodents and rabbits

Removal or damage of grasses and shrubs will result in initial adverse impact and elimination of the disturbed area as suitable habitat

for rodents and rabbits. Stress tolerances are high in these species and population recovery will be relatively rapid following successful rehabilitation efforts. Long term effects from a total population standpoint, will be limited to actual habitat removal (about 1,650 acres).

#### Upland game birds

Destruction of vegetation during construction will remove disturbed areas from game bird habitat. An estimated 3,900 acres of sage grouse habitat will be affected. Sagebrush removal will eliminate the value of land for sage grouse for the life of the railroad. Periodic applications of herbicide for weed control, which also removes sagebrush, will eliminate sage grouse habitat indefinitely. This amount of habitat provides seasonal or year long habitat for at least 35 to 50 birds. Anticipated losses could be considerably in excess of the above figure due to the almost certain destruction or damage of mating and nesting areas along the proposed route.

Sharptail grouse may occur along the proposed route in the northern portions. Insufficient information is available to analyze impacts on this species. Where populations may exist an estimated density of less than five birds per section of habitat applies.

Actual operation of the railroad will result in an undetermined mortality of all game birds through "collisions."

#### Other birds

Disturbance during construction and operation will disrupt use by raptors and other species. Eventual "re-discovery" of lands adjacent to the railroad will depend on individual species tolerance of foreign intrusions as well as the availability of forage or prey species.

## Fish

Drastic modification of drainages or loss of riparian vegetation will upset an already fragile situation. Crossings would be constructed over streams including Caballo Creek, Belle Fourche River, Coal Creek, Little Thunder Creek, Mike's Draw, Box Creek, Lightning Creek, Shawnee Creek and possibly Walker Creek. Many of these contain marginal to fair aquatic habitat for various species of fish. Extensive use of culverts will be required near Antelope and Shawnee Creeks. Changes resulting in habitat deterioration such as siltation and sedimentation, oil and grease spillage, would most probably occur during initial construction.

The line as staked (March 1974) passes through one stock pond reservoir, destroying any aquatic habitat associated with it.

Application of herbicides near aquatic habitat would result in damage to surface water quality and riparian habitat.

## Reptiles and amphibians

Available information is not sufficient to allow a specific analysis of impacts. Refer to Part I of this statement.

## Invertebrates

Permanent loss of vegetation will result in direct loss of invertebrates. The degree of reclamation success and habitat suitability will govern population reinvasions by invertebrates.

## Recreation

Construction of the proposed rail link between Douglas and Gillette is not expected to have a significant impact on recreational use of the area. Only 20 percent of the proposed line crosses federally administered surface land. The remainder of the line would cross private and/or state land. A majority of the area is a popular antelope hunting area. The proposed route does cross approximately 21 miles of the Thunder Basin National Grasslands. The total recreational use (1973) occurring in the grasslands was approximately 31,600 visitor days.

The major impact of the railroad on recreation use is expected to occur from the point where it joins the present Amax spur line south of Gillette to the Hilight Oil Field (25 miles) and an additional 40 miles, of varying intervals, along the balance of the proposed route. These areas are basically uninhabited and served only by a few county roads and truck trails. Construction of the railroad in this area could cause an impact on recreational access. Construction will make east-west access more difficult for the recreational user, especially the hunter. Grade crossings will be limited to the major access routes with many of the minor truck trails cut off. The railroad right-of-way will tend to create a long, linear, north-south barrier through these undeveloped areas.

The acreage and vegetation that will be removed or disturbed by the railroad right-of-way (3,900 acres) will probably not significantly affect recreation use except for the acreage removed from productivity (1,650 acres) or disturbed aquatic habitat.

The noise from frequent trains, as many as 46 a day by 1990, will displace wildlife. Reductions of wildlife populations, noise of rail

traffic, and the visible intrusion of the railroad will have a corresponding impact on hunters and hunting success ratios.

Train frequency through this area could also impact the recreational user in other ways. Over-the-grade crossings, expected rail traffic, hauling the estimated yearly production of 93 million tons of coal by 1990 will cause more inconvenience for those trying to cross the right-of-way. Also, an increased probability of train-recreation vehicle accidents can be expected. The noise of train operations will interrupt the peaceful solitude the recreationist now enjoys here.

Substitution of one type of sightseeing use for a different type along Highway 59 will probably occur. However, it is not possible to say if this would be an adverse impact or not. To some, it may be (those who prefer to see antelope) while to others (those who enjoy watching unit train operations) it may not be an adverse impact.

Construction, and especially operation, of the railroad will cause an increase in population and, therefore, increase recreation use levels. Population increases will more than likely remove additional land from productivity for wildlife and further impact the recreational use of hunting.

Total population increase as a direct result of railroad construction and operation is projected to be 2,820 by 1990, removing 141 acres for residential and service oriented needs. This would be a 15 percent increase over current population levels in Campbell and Converse Counties. The recreation use generated from this population increase could overload and deteriorate existing recreation facilities in or near Douglas and Gillette.

The overall impact of railroad construction on recreation is the restriction on recreationist access and the safety hazard. The

barrier cuts off traditional access roads, hindering freedom of cross country travel or, in cases of emergency, impedes cross country travel.

## Agriculture

Construction of the proposed railroad will have varying impacts on agricultural land use. Impacts will result from construction activities within and outside of the proposed 2,400-acre right-of-way. An additional 1,500 acres outside the right-of-way will be disturbed or required for access roads, borrow areas, campsites, staging areas. Secondary impacts will also occur and will be related to the increase in population brought in by construction and operation of the rail line.

### Livestock grazing

Based on an average of 6.5 acres per animal unit month (AUM) and the assumption that the entire right-of-way will be fenced, there will be a permanent loss of 369 AUMs associated with the removal of 2,400 acres of land from grazing use. This total AUM loss involves 75 AUMs of grazing use on 160 acres of hay field after harvesting of the hay crop has occurred, and 160 AUMs produced on 345 acres of seeded pastureland. The total permanent loss of AUMs is approximately 0.04 percent of that produced in the study area.

Disturbance of the 1,500 acres outside the right-of-way will affect an estimated 231 AUMs. An estimated 550 acres of this will be a permanent loss (85 AUMs) due to access road construction, population increase and fire guards. The remainder will be a temporary loss for the two-year construction period. Use of an additional 9,530 acres, which furnishes 1,466 AUMs of forage, will be impaired. The rail line will sever this acreage from its water source. Without adequate livestock water this land may become unusable from a livestock grazing standpoint. In this case these AUMs may be considered a permanent loss.

The rail line as presently staked (March 1974) will destroy four water wells and one reservoir used for watering livestock. Loss of water sources will impair utilization of the adjoining rangeland and create an inconvenience and expense for the rancher who has to supply additional water sources for cattle. Some drainage patterns may be interrupted and rechanneled by the railroad grade. The rechanneling could increase water velocity and erosion. This could result in a loss of productive land surface and would increase sedimentation and siltation which would affect downstream stock water storage facilities. Diversion of water to different channels would also decrease infiltration which reduces the irrigation effect on forage adjacent to the channel and lowers grazing capacity in these areas.

Although less than ten percent of the acreage in the vicinity of the railroad is irrigated, this acreage plays an important role in livestock production by furnishing crucial winter supplemental feed. Some irrigation systems could be severed or disrupted by the railroad grade, including structures conveying water as well as flow of water in the severed fields. If this occurs, the productive capacity of the fields will be reduced as they become nonirrigated rangeland. An unknown number of these fields have been seeded to introduced species that cannot survive without irrigation. All production in these fields would be lost until native species become re-established and even then production would be lowered.

Impacts on ranching operations will also occur from severance of pastures by the railroad. It is difficult to assess this impact with the data presently available. Severance is complex and must be viewed in two forms; severance of units of economically manageable size, and those severed that are too small to be economically manageable. The proposed

route will divide 65 pastures. When the right-of-way parallels the boundary of a pasture or the roads and highways along the route, the right-of-way boundary may not always be synonymous with the pasture fence or road. This will sever additional land, approximately 29 pastures, that may not be economically manageable. In five instances, headquarter facilities will be severed from a part of the ranch property. This will cause inconvenience to the ranchers in reaching their pastures and could increase their operating costs, which in the long term could make ranch operation uneconomical.

The railroad grade will change the freedom of and pattern of access in the area. The loss of free access could have a major effect on livestock grazing operations. Since access points will be limited, more travel on the part of the rancher will be required. Cattle will have further distances to travel to reach certain pastures. This could effect the weight gain of the cattle, as well as cause overgrazing in certain areas which would tend over time to reduce grazing capacity on the area adjacent to the railroad. The operation of the rail line will cause a certain amount of cattle death from train-cattle collisions, despite the fact that in all probability the right-of-way will be fenced to prevent this type of mortality.

Livestock drift with a storm during extreme blizzard conditions. Historically heavy livestock losses have occurred due to traps created by fences, deep-cut draws and other obstacles. The fenced railroad right-of-way would be an additional obstacle. Some additional livestock losses could be expected during these conditions.

As observed in other areas, railroad rights-of-way are susceptible to the establishment of invader species of plants through natural revegetation. The disturbed soil becomes more susceptible to this type of species invasion. The possibility also exists for seeds of invader species to be brought in by trains. The forage value of these species range from undesirable to poisonous. In any case they often spread, crowding out more desirable forage plants. If poisonous species become established and spread off the right-of-way, livestock death could occur.

Fills (maximum height of 85 feet) and cuts (maximum depth of 102 feet) will alter wind patterns in the immediate area. The area generally experiences drifting snow during winter months. New cuts and fills will have a tendency to cause snowdrifts downwind from the railroad grade. The drifts will occur in areas that have not previously experienced drifting and could alter the vegetation. Drifting could also cause fences to collapse, allowing livestock to drift between pastures and onto the rail line where they would be subject to mortality from trains.

Operation of trains occasionally starts fires along the right-of-way. Based on past fire statistics for this area, trains may cause 10 to 50 fires, burning from 200 to 3,000 acres per year. As frequency of trains increases with coal production, the fire frequency could also increase. Fires will cause a loss of livestock forage. Loss would be temporary for a period of one to two years until the area become revegetated.

Noise from construction activities and especially train operations after completion of construction could disturb cows and ewes during calving and lambing periods. Each train could produce noise in the 88- to 98-decibel range. With train frequency averaging 26 per day in 1980 and 46 per day in 1990, the noise level could be significant. The effect on cattle is not as pronounced, but ewes may leave their lambs if they are disturbed during lambing.

Herbicides are used to inhibit or prevent plant growth along the rail line. On occasions soil sterilants are used. If the herbicides drift off of the right-of-way, livestock forage could be reduced, with a resulting loss in AUMs. Long term use of soil sterilants and accumulation in the soil could in time inhibit all plant growth for some distance outside the right-of-way.

## Farming

The proposed right-of-way will permanently remove from production 168 acres of cropland. Based on a ten-year average production, this will be a loss of 227 tons of annual hay production. Construction activities outside the right-of-way will cause a temporary (1 year) loss of 81 tons of hay production on 60 acres. The permanent loss is approximately 0.3 of one percent of the total production for the study area.

Hayland severed by division may be in parcels too small for economical management. This may occur in six fields. In two specific instances in the Shawnee Creek drainage, the homestead has been severed from the cropland by the right-of-way. Loss of access to homesteads may impede marketing of farm products and delivery of operation supplies. In all probability an inconvenience to the rancher will occur.

## Transportation Networks

The proposed rail line will cross as many as 50 unimproved and graded dirt roads and many lesser roads which are all generally lightly used for access to ranches and oilfields. Most of the private, county and state roads which are intersected will be routed across the rails via a simple grade crossing. Approximately 18 grade crossings and five grade separations (bridges or underpasses) of county and state roads have been identified. Highway 59 will have a railroad undercrossing four miles north of Bill and 17 miles south of Bill. Highway 20 will have a railroad overcrossing. The grade crossing at Hoadley road will require a railroad undercrossing or a three-mile road relocation; at Matheson Road only minor road relocation will be required and the railroad undercrossing of county road 3-38 (sec. 35, T40N, R71W) may require road relocation to the south. Table 2 lists the possible crossings and type.

During construction activities traffic will have to be rerouted and will be subject to delays and reduced speed. This will cause an inconvenience for the traveler as well as ranchers and other users of the area. The impact at any one point is not expected to be of long duration. This type of inconvenience impact will not last beyond the two year construction period.

The possibility of increased snow drifting along Highway 59 on the downwind side of railroad fills looms as a strong possibility particularly when the railroad is located on the west side of the highway and most subject to influence by the prevailing westerly winds. The result would be hazardous driving and increased maintenance requirements by the State Highway Department. Furthermore, if roads at the grade crossings have pronounced slope depressions in them as they ascend or descend the grade they will have a tendency

Table 2

## County and State Highway Crossings Along the BN and C&amp;NW Route

<u>Road Description</u>	<u>Type of Crossing</u>	<u>Comments</u>
Bishop Road	Grade crossing	
T-7 Road	Possible grade separation	
Hoadley Road	Railroad undercrossing or	3 mile road relocation
Lawver Road	Railroad undercrossing	1 mile road relocation
Hilight Road	Grade crossing	
Mills Road	Grade crossing	
Keeline Road	Grade crossing	
Sec. 14-23, T44N, R72W	Grade crossing	
Small road @ Station 2213+00	Grade crossing	
Gopher Booster Road	Grade crossing	
Antelope Road (Tekla)	Grade crossing	May require signals and road relocation
Edwards Road	Grade crossing	
Matheson Road	Grade crossing	Minor road relocation
Antelope Road	Grade crossing	
Forest Service Road (N. of Antelope Creek)	Grade crossing	
County Road 3-38, Sec. 35, T40N, R71W	railroad undercrossing	Possible road relocation to south
Highway 59 (4 miles N. of Bill)	Railroad undercrossing	
Tillard Road	Grade crossing	
Highway 59 (17 miles So. of Bill)	Railroad undercrossing	
Walker Creek Road	Grade crossing	
County Road, Sec. 2, T33N, R70W	Grade crossing	
County Road, Sec. 17-20, T33N, R69W	Grade crossing	
County road, Sec. 15, T32N, R69W	Grade crossing	
Highway 20	Railroad overcrossing	

Source: Adapted from Burlington Northern and Chicago and North Western  
Environmental Impact Analysis, 1974.

to fill with drifting snow and thus impede public access across them and possibly block someone from access to his property.

Some minor relocations of electric transmission lines, water and oil pipelines may be required. These relocations can be made without causing any significant impacts on the utilizer of these facilities.

The major impact on transportation systems will arise from train operations over the proposed rail line and existing rail lines. Based on projected amounts of coal to be exported from this area of 48 million tons in 1980, 68 million tons in 1985 and 93 million tons in 1990, as many as 24, 34, and 46 unit trains per day may be expected to make the trip over the proposed line. These include loaded and unloaded trains. A train of 110 cars and 5 diesel units would be approximately 6,165 feet long (1.2 miles). One train operating at 20 miles per hours would pass any given point in 3½ minutes. Therefore, any given stretch of track, i.e., road crossing, would be occupied per day approximately 84 minutes in 1980, 119 minutes in 1985 and 161 minutes in 1990. Although the roads to be crossed by road crossings are less traveled than the state highways, some restriction of freedom of movement across the tracks will occur. There is also the potential for an indeterminable number of train-auto accidents at grade crossings to occur due to increased train traffic. A major problem and impact could occur on the existing mainline at Glendo where the tracks cross U.S. Highway 26 and 87. With increased train traffic at this road crossing, the Wyoming State Highway Department has indicated that a potential traffic tie-up problem could occur. At the present time (April 1974) a signal and gate is located at this crossing.

Increased unit coal train traffic across the existing mainline could cause a rapid deterioration of the mainline. The present mainline was not

constructed to standards that would allow useage as projected to export the coal to be mined. Burlington Northern is planning and programming the upgrading of all lines that will experience coal train traffic.

## Socio-Economic Conditions

This section does not reiterate any of the socio-economic impacts identified in Part I, but will describe the changes and impacts on employment, income, population and capital investment in Campbell and Converse Counties that are directly related to the railroad.

Projected employment for the railroad is based on the number of employees required per million tons of coal shipped. Railroad employment is estimated to be between 2.5 and 5.0 men per million tons of coal shipped, the variance being dependent on the shipping distance. The projected railroad employment for Campbell and Converse Counties is shown on Tables 4 and 5 in Appendix D and is based on the employment projection model used by the Northern Great Plains Resource Program (NGPRP)\*. Combined railroad employment in the two counties is expected to increase from 17 in 1970 to 258 by 1980, 70 percent of which will be employed in Converse County. Projected employment is summarized in Table 3.

Table 3

### Railroad Employment

	Actual	Projected			
	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Campbell County	11	11	77	91	91
Converse County	6	22	181	256	304
Total	17	33	258	347	395

An additional 300 temporary positions will be created during construction of the railroad, 85 percent of which the railroad estimates will be filled from local trade union personnel. Source of this labor will likely

\*Developed by University of Wyoming, Water Resources Research Institute.

be by a combination of employing the presently unemployed, attraction from other employment sectors and importation of labor from outside the area. A beneficial impact of the new railroad employment will be provision of employment opportunities for the presently unemployed and allowing people to possibly move from lower paying jobs to higher ones. Resultant labor deficiencies in other employment sectors should labor demands exceed supply would be an adverse impact.

It is estimated that the average annual income to be paid to the 258 railroad employees in 1980 will be approximately \$15,000.\* This is nearly \$3.9 million annually. The net impact of this income will be to raise per capita, mean and medium incomes in the two counties to a level above that of 1970 and higher than would have been expected without the new railroad employment. This annual income will be worth more to the economy than the salaried amounts because it will generate demands for additional goods and services both within and outside the two counties. This is generally know as the multiplier effect. It is not unrealistic for the income multiplier to be from 3 to 5 times the amount of disposable income originally created. The \$3.9 million, less state and federal taxes, yields approximately \$3.1 million in annual disposable income which could generate a total of \$9.3 to \$15.5 million disposable income to a broad market area.

The number of additional jobs required in the services sector of the economy to accommodate the increase in basic employment (railroad) can be estimated. Based on the ratios of basic employment to total employment used by

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\*This derives from an estimated 1974 salary of \$11,200 increased five percent per annum up to 1980.

Table 5

Total Employment and Associated Population Increase\*

	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Campbell County				
Total Employment**	0	200	242	242
Population (Rounded)	0	470	550	550
Converse County				
Total Employment**	48	530	756	903
Population (Rounded)	120	1,290	1,800	2,150

\*Based on model developed for NGPRP by Water Resources Research Institute, University of Wyoming.

\*\*Summation of new railroad employment and induced secondary employment.

Burlington Northern estimates its capital investment for the railroad will be nearly \$35 million. The new rail mileage will add to the ad valorem tax base for Campbell and Converse County. Based on a report prepared for Burlington Northern by the University of Denver Research Institute, the additional tax base for Campbell County is estimated to be \$50,000, and \$98,000 for Converse County. Shipment of coal is intended for markets throughout the midwest with future potential markets in the southeast United States, Colorado and Texas. The shipment of coal to these markets will produce economic effects in those localities but they cannot be assessed or traced out at this time.

the Water Resources Research Institute, University of Wyoming, for the Northern Great Plains Resource Program, each addition to basic employment in Campbell and Converse Counties will generate approximately two additional jobs in secondary employment sectors. This includes employment in new construction for housing, business and consumer services, education and government, the general impact of which is to create an increasing wider variety of job opportunities for the local populace. Table 4 summarizes this increase.

Table 4

Total Employment Increase Attributable to the Railroad\*

	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
Campbell County				
Railroad Employment**	0	66	80	80
Secondary (Services) Employment	0	134	162	162
Converse County				
Railroad Employment**	16	175	250	298
Secondary (Services) Employment	32	355	506	605

\*Based on model developed for NGPRP by Water Resources Research Institute, University of Wyoming.

\*\*Base year 1970 existing railroad employment is not included.

Estimates for total population increase as a result of new railroad employment and induced secondary employment can be made and are summarized in Table 5.