Table 4.3-16
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 20 MNT - 70 dBA L_{dn}

County and Communities	Existing and 11 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Hughes	**0**	**0**	**0**	**0**	**0**	**0**	**155**	**279**	**124**
Harrold	0	0	0	0	0	0	3	28	25
Blunt	0	0	0	0	0	0	3	5	2
Canning	0	0	0	0	0	0	0	0	0
Alto	0	0	0	0	0	0	0	0	0
Pierre	0	0	0	0	0	0	148	241	93
Stanley	**0**	**0**	**0**	**0**	**6**	**6**	**57**	**77**	**20**
Ft. Pierre	0	0	0	0	6	6	56	70	14
Wendte	0	0	0	0	0	0	1	4	3
Jones	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Capa	0	0	0	0	0	0	0	0	0
Haakon	**0**	**0**	**0**	**0**	**0**	**0**	**24**	**78**	**54**
Midland	0	0	0	0	0	0	12	24	12
Nowlin	0	0	0	0	0	0	0	1	1
Powell	0	0	0	0	0	0	0	0	0
Philip	0	0	0	0	0	0	12	53	41
Jackson	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**2**
Cottonwood	0	0	0	0	0	0	1	3	2
Pennington	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**58**	**50**
Quinn	0	0	0	0	0	0	0	15	15
Wall	0	0	0	0	0	0	8	43	35

[1] - E=existing P=proposed I=increase

Table 4.3-17
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 50 MNT - 70 dBA L_{dn}

County and Communities	Existing and 21 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Brookings	**0**	**0**	**0**	**2**	**7**	**5**	**73**	**146**	**73**
Elkton	0	0	0	0	0	0	26	64	38
Aurora	0	0	0	2	7	5	43	73	30
Arlington	0	0	0	0	0	0	1	2	1
Kingsbury	**0**	**0**	**0**	**0**	**16**	**16**	**124**	**412**	**288**
Arlington	0	0	0	0	1	1	17	76	59
Hetland	0	0	0	0	0	0	6	28	22
Lake Preston	0	0	0	0	1	1	31	101	70
De Smet	0	0	0	0	14	14	54	143	89
Manchester	0	0	0	0	0	0	10	26	16
Iroquois	0	0	0	0	0	0	6	20	14
Beadle	**0**	**0**	**0**	**1**	**5**	**4**	**37**	**251**	**214**
Iroquois	0	0	0	0	0	0	3	15	12
Cavour	0	0	0	0	0	0	3	34	31
Morningside	0	0	0	0	0	0	0	0	0
Huron	0	0	0	1	3	2	16	151	135
Wolsey	0	0	0	0	1	1	10	48	38
Wessington	0	0	0	0	1	1	3	54	51
Hand	**0**	**0**	**0**	**0**	**8**	**8**	**35**	**282**	**317**
Wessington	0	0	0	0	0	0	5	9	4
Vayland	0	0	0	0	0	0	1	8	7
St. Lawrence	0	0	0	0	0	0	1	48	47
Miller	0	0	0	0	6	6	27	129	102
Ree Heights	0	0	0	0	0	0	0	17	17
Hyde	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**64**	**57**
Highmore	0	0	0	0	0	0	6	62	56
Holabird	0	0	0	0	0	0	0	1	1

Table 4.3-17
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 50 MNT - 70 dBA L_{dn}

County and Communities	Existing and 21 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Hughes	**0**	**0**	**0**	**0**	**15**	**15**	**155**	**591**	**436**
Harrold	0	0	0	0	1	1	3	40	37
Blunt	0	0	0	0	1	1	3	13	10
Canning	0	0	0	0	0	0	0	0	0
Alto	0	0	0	0	0	0	0	0	0
Pierre	0	0	0	0	13	13	148	530	383
Stanley	**0**	**4**	**4**	**0**	**9**	**9**	**57**	**182**	**125**
Ft. Pierre	0	3	3	0	9	9	56	176	120
Wendte	0	0	0	0	0	0	1	5	4
Jones	**0**	**0**	**0**	0	**0**	**0**	0	**0**	0
Capa	0	0	0	0	0	0	0	0	0
Haakon	**0**	**2**	**2**	**0**	**15**	**15**	**24**	**148**	**172**
Midland	0	0	0	0	4	4	12	37	25
Nowlin	0	0	0	0	0	0	0	4	4
Powell	0	0	0	0	0	0	0	0	0
Philip	0	0	0	0	11	11	12	102	90
Jackson	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**4**	**3**
Cottonwood	0	0	0	0	1	1	1	4	3
Pennington	**0**	**0**	**0**	**0**	**6**	**6**	**8**	**111**	**103**
Quinn	0	0	0	0	0	0	0	30	30
Wall	0	0	0	0	6	6	8	81	73

[1] - E=existing P=proposed I=increase

Table 4.3-18
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 100 MNT - 70 dBA L_{dn}

County and Communities	Existing and 37 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Brookings	**0**	**0**	**0**	**2**	**22**	**20**	**73**	**171**	**98**
Elkton	0	0	0	0	0	0	26	74	48
Aurora	0	0	0	2	20	18	43	81	38
Arlington	0	0	0	0	1	1	1	1	0
Kingsbury	**0**	**0**	**0**	**0**	**43**	**43**	**124**	**625**	**501**
Arlington	0	0	0	0	1	1	17	102	85
Hetland	0	0	0	0	0	0	6	33	27
Lake Preston	0	0	0	0	8	8	31	131	100
De Smet	0	0	0	0	32	32	54	285	231
Manchester	0	0	0	0	2	2	10	14	4
Iroquois	0	0	0	0	0	0	6	60	56
Beadle	**0**	**0**	**0**	**1**	**13**	**12**	**37**	**514**	**477**
Iroquois	0	0	0	0	1	1	3	25	22
Cavour	0	0	0	0	0	0	3	52	49
Morningside	0	0	0	0	0	0	0	0	0
Huron	0	0	0	1	6	5	16	262	246
Wolsey	0	0	0	0	2	2	10	88	78
Wessington	0	0	0	0	3	3	3	81	78
Hand	**0**	**0**	**0**	**0**	**27**	**27**	**35**	**319**	**284**
Wessington	0	0	0	0	0	0	5	9	4
Vayland	0	0	0	0	0	0	1	8	9
St. Lawrence	0	0	0	0	2	2	1	74	73
Miller	0	0	0	0	25	25	27	193	166
Ree Heights	0	0	0	0	0	0	0	22	22
Hyde	**0**	**1**	**1**	**0**	**0**	**0**	**7**	**125**	**118**
Highmore	0	0	0	0	0	0	6	123	117
Holabird	0	0	0	0	0	0	0	2	2

Table 4.3-18
Existing Rail Line - South Dakota
Noise Sensitive Receptor Comparison
Existing and Proposed Conditions at 100 MNT - 70 dBA L_{dn}

County and Communities	Existing and 37 Trains Per Day								
	Wayside			Wayside/horn			Horn		
	E [1]	P [1]	I [1]	E	P	I	E	P	I
Hughes	**0**	**7**	**7**	**0**	**39**	**39**	**155**	**1,565**	**1,410**
Harrold	0	0	0	0	1	1	3	58	55
Blunt	0	1	1	0	1	1	3	36	33
Canning	0	0	0	0	0	0	0	9	9
Alto	0	0	0	0	0	0	0	0	0
Pierre	0	5	5	0	37	37	148	1,462	1,314
Stanley	**0**	**4**	**4**	**0**	**19**	**19**	**57**	**324**	**267**
Ft. Pierre	0	3	3	0	17	17	56	314	258
Wendte	0	0	0	0	2	2	1	4	3
Jones	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Capa	0	0	0	0	0	0	0	0	0
Haakon	**0**	**8**	**8**	**0**	**20**	**20**	**24**	**172**	**148**
Midland	0	0	0	0	6	6	12	46	34
Nowlin	0	0	0	0	0	0	0	5	5
Powell	0	0	0	0	0	0	0	0	0
Philip	0	6	6	0	14	14	12	120	108
Jackson	**0**	**0**	**0**	**0**	**2**	**2**	**1**	**10**	**9**
Cottonwood	0	0	0	0	2	2	1	10	9
Pennington	**0**	**0**	**0**	**0**	**3**	**3**	**8**	**120**	**112**
Quinn	0	0	0	0	0	0	0	30	30
Wall	0	0	0	0	3	3	8	90	82

[1] - E=existing P=proposed I=increase

Under all the projected levels of operation, a significant number of noise sensitive receptors would be subjected to increased levels of noise. The majority of these noise sensitive receptors would be residences located within the small communities along the rail line. The most significant increase in noise levels would result from the increased sounding of train horns at grade crossings due to more trains passing through the crossings. However, additional noise sensitive receptors would be affected by increased wayside noise while others would experience an increase in both wayside and horn noise exposure. In fact, for many of the communities along the rail line, the entire community would fall within the calculated noise contour at some level of operation. These communities and the levels of operation at which the entire community would be within the 65 dBA L_{dn} are given in Table 4.3-19. SEA determined the overall increase in noise sensitive receptors exposed to noise levels of 65 dBA L_{dn} or greater would be significant at all levels of projected future rail line operation.

Table 4.3-19
Communities within 65 dBA L_{dn} Noise Contour*

Community	Condition			
	Existing	20 MNT	50 MNT	100 MNT
Aurora			X	X
Hetland			X	X
Manchester		X	X	X
Cavour				X
Wessington				X
Vayland			X	X
Holabird			X	X
Harrold				X
Canning			X	X
Wendte			X	X
Van Metre		X	X	X
Midland				X
Nowlin		X	X	X

Table 4.3-19
Communities within 65 dBA L_{dn} Noise Contour*

Community	Condition			
	Existing	20 MNT	50 MNT	100 MNT
Powell		X	X	X
Cottonwood			X	X
Quinn			X	X

* "X" denotes level at which entire community would be within the 65 dBA L_{dn} contour.

SEA recognizes that the majority of noise generated by trains during operation` results from horn soundings. Train horn soundings are deliberately caused, and in many states, required by law, to enhance the safety of vehicles at grade crossings of active rail lines. SEA understands that horn noise can create an adverse environmental impact and is an annoyance. However, SEA has refrained from requiring mitigation of horn noise in past cases, indicating that "any attempt to significantly reduce [train horn] noise levels at grade crossings would jeopardize safety, which we consider to be of paramount importance."[10] A study by the Federal Railroad Administration (FRA) evaluating the impacts of whistle free crossings in Florida on rail safety provides support for SEA's position. In its study, FRA determined vehicle/train accidents increased between 195 and 500 percent. The study depends on considerations such as how many accidents whistles would not have prevented, and what constituted an accident at crossings where whistle soundings were banned.[11] Additionally, in a joint study between FRA and the Association of American Railroads (AAR), it was determined that crossings with whistle bans averaged 84 percent more collisions than comparable crossings where whistles were sounded.[12]

Recent Federal legislation, specifically the Swift Act (49 U.S.C. 20153), directs the Secretary of the Department of Transportation (DOT) to develop regulations relating to noise and rail safety measures. FRA is the Federal agency within DOT with primary responsibility for

[10] Surface Transportation Board, Section of Environmental Analysis. *Union Pacific Railroad-Control-Southern Pacific Railroad*, Decision No. 44, Finance Docket No. 32760, August 12, 1996.

[11] Federal Railroad Administration. 1999. Cited in *Use of Locomotive Horns at Highway-Rail Grade Crossings; Proposed Rule.* Docket No. FRA-1999-6439, Notice No. 1. Issued December 16, 1999. Federal Register, January 13, 2000.

[12] Ibid.

establishing train horn requirements and alternatives. On January 13, 2000, FRA published a Notice of Proposed Rulemaking in the Federal Register that proposes requirements for locomotive horn sounding at grade crossings and a procedure for the establishment of "quiet zones" for train horns. FRA defines a quiet zone as a "segment of rail line within which is situated one or a number of consecutive highway-rail crossings at which locomotive horns are not routinely sounded." FRA's proposal includes establishing an application process for communities to obtain FRA approval to establish quiet zones. Approval would require the community to implement supplemental safety measures, such as four-quadrant gates, directional horns, median barriers, temporary road closures, or other measures determined by FRA to be effective at enhancing grade crossing safety. FRA has prepared a Draft EIS as part of its proposed rulemaking. Following completion of its EIS process, FRA will publish the final rule. The final rule will take affect one year after its publication. However, no dates for publication of the final rule have been proposed. SEA believes that FRA's final regulations will provide a safe, effective means to address horn noise concerns and encourages communities along the existing DM&E rail line to participate in FRA's process.

4.3.9.2 Vibration

Operation of the proposed project would likely result in changes in ground vibration caused by operation of trains over the existing rail line. Replacement of jointed rail and deteriorated ballast may help reduce ground vibration. However, the increased length, weight, and frequency of unit coal trains as compared to freight trains, although similar to unit grain trains, would likely result in increases in the magnitude and occurrence of ground vibration.

Ground vibration may be a concern for several reasons. These include:

- structural damage to buildings and residences
- concern for structural damage
- nuisance or inconvenience
- affects on sensitive equipment, such as precision manufacturing tools, electron microscopes, magnetic resonance imaging systems, bench microscopes, micro-balances, laer interferometers, and magnetometers.

Ground vibration undoubtedly occurs along the existing DM&E rail line and was reported by residents along the rail line during the scoping process.

The magnitude of existing vibration is a result of the type of trains currently operating on the existing DM&E rail line and the characteristics of the soils adjacent to specific portions of the rail line. Ground vibration is highly dependent on the specific soil characteristics (shear stiffness,

uniformity, depth to rock, percentage of clay, sand, loam, or other soil particles) at a particular location. Although soils would not change as a result of this project, the weight of trains operating on the existing rail line would increase. This would have the potential to increase the magnitude of ground vibration. The magnitude of vibration would be the same for all levels of operation because it is caused by only a single train event. The magnitude of vibration would not increase with more trains, only the frequency at which the vibration events would occur.

SEA conservatively determined that ground vibration could be sufficient to cause structural damage to buildings located within 100 feet of the rail line (Appendix F). Table 4.3-20 provides the number of structures within this distance. Structural damage may not result in conditions requiring repair or concern over structure stability, such as minor cracks in foundations or plaster walls. Additionally, individuals occupying these structures would experience vibration at levels likely to cause disturbance to daily life and be considered a nuisance. Such disturbances could include rattling of windows, items on tables, walls, and shelves and interruption of sleep, conversation, or listening activities (television, radio), similar to those many of these residents may currently be experiencing. These structures could experience minor damage such as cracking of wall or foundations and breakage of items falling from tables, walls, or shelves due to rattling.

Beyond 100 feet, ground vibration would be expected to lessen to a magnitude that would not result in structural damage. However, SEA determined that between 101 and 200 feet, ground vibration could be of sufficient magnitude to cause concern that structural damage would occur. Structural damage within this range would be unlikely. However, ground vibration may be felt at a level great enough to cause building owners and residents to be concerned that damage would occur. These individuals could experience continual concern and frustration worrying about potential damage. Their quality of life may be reduced as a result of frequent vibration events and the potential disturbance and inconvenience associated with rattling of windows, walls, pictures, and items on shelves and minor damage that may occur from items breaking from rattling off tables, walls, or shelves.

Ground vibration is anticipated to extend outward from the existing rail line for several hundred feet. Beyond 200 feet, ground vibration may still be above the level of human perception. SEA determined that structures between 201 and 400 feet from the rail line could perceive some level of ground vibration. This vibration would present an inconvenience or annoyance to individuals experiencing it. However, it would not be expected to cause any structural damage or significant reduction in individuals' quality of life.

Ground vibration, even at levels below those perceived by humans, may effect sensitive equipment such as that found in hospitals, major medical facilities, and certain types of manufacturing facilities. SEA did not identify any such facilities along the existing rail line in

South Dakota close enough to the rail line to be of concern. Therefore, no impacts would be anticipated.

Table 4.3-20
Existing Rail Line - South Dakota
Structures Potentially Impacted by Vibration

County and Community	0 - 100 Feet	101 - 200 Feet	201 - 400 Feet	Total
Brookings	**3**	**21**	**41**	**65**
Elkton	0	0	19	19
Aurora	3	21	17	41
Kingsbury	**0**	**34**	**131**	**165**
Arlington	0	1	31	32
Hetland	0	0	9	9
Lake Preston	0	7	32	39
Desmet	0	26	40	66
Manchester	0	0	10	10
Iroquois	0	0	7	7
Beadle	**1**	**14**	**61**	**76**
Cavour	0	0	7	7
Huron	1	5	20	26
Wolsey	0	2	14	16
Wessington	0	5	14	19
Hand	**3**	**10**	**51**	**64**
Vayland	0	0	3	3
St. Lawrence	1	1	9	11
Miller	2	8	34	44
Ree Heights	0	0	3	3
Hyde	**0**	**4**	**18**	**22**
Highmore	0	4	17	21
Holabird	0	0	0	0
Hughes	**1**	**1**	**96**	**98**
Harrold	1	0	9	10
Blunt	0	1	3	4
Canning	0	0	4	4
Rousseau	0	0	12	12
Pierre	0	0	63	63

Table 4.3-20
Existing Rail Line - South Dakota
Structures Potentially Impacted by Vibration

County and Community	0 - 100 Feet	101 - 200 Feet	201 - 400 Feet	Total
Stanley	**4**	**12**	**38**	**54**
Ft Pierre	4	9	29	42
Wendte	0	2	2	4
Jones	**0**	**1**	**4**	**5**
Capa	0	0	1	1
Haakon	**2**	**21**	**52**	**75**
Midland	0	5	16	21
Nolin	0	0	2	2
Powell	0	1	0	1
Phillip	1	12	23	36
Jackson	**0**	**1**	**2**	**3**
Cottonwood	0	1	2	3
Pennington	**1**	**11**	**40**	**52**
Quinn	0	0	13	13
Wall	1	9	27	37

4.3.10 BIOLOGICAL RESOURCES

Biological resources include vegetation (Section 4.3.10.1); wildlife (Section 4.3.10.2); aquatic resources (Section 4.3.10.3); and sensitive, threatened, and endangered species (Section 4.3.10.4). SEA determined that the potential for impacts to biological resources would occur primarily during reconstruction of the existing rail line. Operational changes and increases in train traffic would have little effect on biological resources.

4.3.10.1 Vegetation

Construction activities associated with the reconstruction of the rail line would impact vegetation currently present in the right-of-way. The area impacted during construction would include all vegetation within the existing 50 to 250-foot wide right-of-way, the majority of which is grassland. Vegetation within the right-of-way would be cleared or disturbed during reconstruction activities. Following completion of reconstruction, cleared and disturbed areas would be revegetated, resulting in little loss to the vegetative community. The exception would

be at locations where siding would be constructed. In these areas, the rail bed would be expanded and the additional area of right-of-way no longer available for vegetation. Wetland areas within the right-of-way would be lost during reconstruction as described in Section 4.3.7.2.

Ground and vegetative disturbance within the right-of-way could provide opportunities for establishment of noxious weeds. The right-of-way would then be a refuge for these species to survive and provide seed to invade other areas, including native prairie and croplands. Timely revegetation of the right-of-way and application of herbicides would help reduce noxious weed invasion.

The existing DM&E rail line in South Dakota passes through 180 miles of pasture land, 300 miles of cropland, nearly 50 miles of woody vegetation, and approximately 132.9 acres of wetlands. This vegetation outside the right-of-way may be impacted during reconstruction. Woody vegetation such as trees and shrubs could be cleared, and grasses, crops, and prairie disturbed if reconstruction activities are required outside the right-of-way. In addition, trees adjacent to the rail line may be trimmed or cut to allow safe operation of the reconstruction equipment. Disturbance of adjacent areas is only expected to occur in small, scattered locations.

Vegetation control activities potentially include herbicide application to the rail grade, burning the right-of-way on both sides of the track, and sterilizing the right-of-way on both sides of the centerline. Loss or damage to desirable vegetation within the right-of-way as well as adjacent to the right-of-way could occur during these maintenance activities.

Missouri River Bridge

Minimal removal of trees and vegetation could be required for reinforcement of the existing bridge footings during its rehabilitation. Construction of a new bridge would require the removal of vegetation and trees along the new alignment. Impacts associated with the removal of existing vegetation are described above.

4.3.10.2 Wildlife

Wildlife in the project area may be affected during both the short reconstruction period and by continued operation of the rail line. These affects would include habitat loss (both temporary and permanent), noise, train-wildlife collisions, increased human activity, and the possible introduction of contaminants into the environment. In general, wildlife along the existing rail line are habituated to the existing rail line; however, with the increased frequency of trains and their increased speed, some wildlife disturbance and mortality would be anticipated. The

following Sections describe the potential impacts to the various types of wildlife found along the existing rail line.

4.3.10.2.1 Big Game

Deer (located along the entire rail line) and antelope (limited to the western end of the rail line) inhabiting areas adjacent to the existing rail line are likely to be displaced during reconstruction. Noise, habitat disturbance from reconstruction activities, and human activity would cause big game to seek undisturbed and more secure areas away from the rail line. These same individuals would likely return to the area once reconstruction and reclamation of disturbed areas has been completed. The overall impact of construction-related displacement on local deer and antelope populations would be relatively short-term and limited to the duration of reconstruction and reclamation through a particular area. If the reconstruction would extend into the winter, a period of higher stress for wildlife, it could increase the mortality rate of big game, particularly if important winter shelter habitat is lost or in close proximity to the reconstruction area. Other reconstruction-related impacts that could occur include increased hunting and poaching pressure from the presence of reconstruction crews, and mortality related to increased vehicle and equipment traffic.

Operational impacts would primarily be mortality to big game being struck by trains. Deer and antelope unfamiliar with the train, especially the young, would be most susceptible. Any mortality would be greatest during the first few years of operation, as individuals would not be accustomed to increased train activity and speeds. Over time, individuals remaining in habitats along the existing rail line would adapt to more frequent trains and increased speeds and mortality and disturbance would be reduced. Deer and antelope mortality from trains is not expected to result in significant adverse impacts to local big game populations. However, because of the limited number of antelope in South Dakota, any loss of antelope could result in localized overall population declines.

4.3.10.2.2 Game Species

Upland Birds

Pheasants, sharp-tailed grouse, turkey, and mourning dove may occur along and adjacent to the existing rail line. During reconstruction, loss of habitat and reconstruction activity within the right-of-way would displace individuals using habitat within the right-of-way. Individuals using areas immediately adjacent to the right-of-way would also likely move to other areas away from reconstruction activities. Ground nesters, such as pheasants, grouse, and turkeys, may experience some loss of nests from reconstruction equipment operating within the right-of-way.

However, any losses would likely be minimal and insignificant due to the limited area within the right-of-way. Removal of trees would reduce nesting locations for dove. Increased hunting pressure and poaching could also result from the influx of reconstruction workers. However, any losses would likely be insignificant due to the limited area provided by the rail right-of-way and the limited opportunity workers would have for hunting activities.

During rail line operation, impacts to game birds would be primarily from disturbance due to passing trains. Birds using the right-of-way and areas immediately adjacent to it would likely be disturbed and fly when a train was passing. When birds were nesting, leaving the nest could result in nest failure due to exposure of eggs or chicks to predators or the weather. However, these losses would be minimal, as chicks of these species leave the nest shortly after hatching and are capable of hiding. In times of severe winter weather conditions, flushing of birds from cover could result in use of valuable energy reserves and increased exposure, resulting in mortality. Again, these losses would be minimal and only expected during unusually severe weather. In rare instances, birds could flush in the path of the train and be killed. However, these losses would be insignificant to the overall population. Additionally, once the rail right-of-way is revegetated, higher quality nesting and cover habitat than provided by adjacent croplands and grazing land would be available for upland birds within the right-of-way.

Waterfowl

Waterfowl are abundant in project area wetlands, and often utilize adjacent grasslands and cropland for nesting. Waterfowl using these areas during construction for nesting or resting would likely be displaced during the reconstruction period. Noise and human activity would also disturb waterfowl. Loss of wetlands and grasslands in the right-of-way would reduce waterfowl habitat. Reconstruction during nesting could result in destruction of nests and loss of nesting hens within the right-of-way. The potential spills of materials such as gasoline, diesel fuel, lubricating oil, solvents, etc., could contaminate wetlands, reducing water quality and reducing waterfowl invertebrate forage. Loss of waterfowl would be insignificant due to the limited amount of habitat in the right-of-way.

During operation, impacts to waterfowl would be primarily due to disturbance from passing trains. Birds close to the rail line would be displaced to more remote areas. Suitable nesting habitat within the right-of-way would likely be unused as frequent rail operations would cause hens to nest elsewhere. This would reduce the likelihood of mortality to chicks from passing trains. In rare instances, birds could be struck by passing trains.

Small Game and Furbearers

Mammals could initially be displaced during reconstruction of the rail line. However, it is anticipated that most mammals would return to the area once human activity has decreased and reconstruction and reclamation of the right-of-way completed. With increased activity during construction, there is the possibility that increased hunting and poaching could occur. Animals could suffer increased mortality as "road-kill" struck by either trains or vehicles. However, short-term losses of mammals would not significantly impact populations or distributions of these species. Once reclamation of the rail line is complete, it is anticipated that mammals would utilize the reestablished habitat and, due to their high reproductive potential, quickly repopulate the area.

4.3.10.2.3 Non-Game Species

Amphibians and Reptiles

Many of the amphibian and reptile species found within the construction area would be displaced or eliminated during construction. Their limited mobility would make it difficult for them to avoid reconstruction equipment. The loss of wetlands and other vegetation would reduce the amount of potential habitat. Increased mortality of some species could also occur because of increased road traffic. Additionally, potential spills of materials such as gasoline, diesel fuel etc., could negatively affect species inhabiting waterways and wetland areas. However, it is anticipated that most species would return once revegetation has been successfully completed. The reconstruction of the DM&E rail line would not significantly impact local amphibian and reptile populations.

Missouri River Bridge

Rehabilitation or construction along the Missouri River could cause disturbance, dislocation, and potential loss of habitat for aquatic species located in proximity of such activities. Some mortality could occur during construction. Impacts would not be significant.

Songbirds

Short-term impacts to songbirds include temporary displacement due to reconstruction activity and human presence and possible loss of edge habitat along right-of-way fence lines due to clearing or trimming of trees and shrubby vegetation. Some loss of nests could occur to both tree and ground nesting species. Noise may also result in disturbance to some species using the right-of-way and adjacent areas. Operation and maintenance of the rail line is not expected to

impact songbirds, as many species have adapted to human activity. Once revegetation of the right-of-way is completed, habitat for a variety of species would be available.

Shorebirds

Shorebirds may be found in project area wetlands and riverine systems with adequate habitat for nesting and foraging. Impacts to shorebirds would be similar to those discussed for waterfowl.

Small Mammals

Impacts to small mammals, primarily rodents, and insectivores (excluding bats), would primarily occur during the rebuild of the existing rail line. Small mammal populations found within the area of construction would be displaced or eliminated during reconstruction. Increased mortality could also occur due to increased road traffic. Once reclamation has taken place along the right-of-way, small mammals are expected to return to the area. Loss of small mammals in the right-of-way is expected to be insignificant.

During operation, impacts to small mammals would primarily result from mortality from passing trains and individuals becoming trapped between the rails. However, losses would be minimal and insignificant.

Raptors

Several raptor species nest, hunt, or winter along the existing rail line. Most raptors are intolerant of human activity during the breeding and nesting seasons. Some raptors would be displaced, probably only until reconstruction is completed. Some hunting and roosting habitat could be removed if trees are cleared and populations of prey species could be altered. Use of the right-of-way by raptors during reconstruction would be expected to decline. Following construction and revegetation, prey species would be expected to return and raptors would use the area for feeding. However, any previous nesting near or in the right-of-way may not resume as a result of the increase in rail traffic. It is possible that some raptors would adapt to the disturbance from passing trains and nest in suitable habitat adjacent to the rail line. During operation, raptors feeding on carrion along the rail line or flying low along or across the rail line may be killed by trains. However, mortality is anticipated to be minimal and insignificant to overall raptor populations in the project area.

4.3.10.3 Aquatics and Fisheries

The existing DM&E right-of-way in South Dakota crosses several rivers, streams, and lakes that provide habitat for a variety of fish and mussel species. However, no trout fisheries are crossed by the existing rail line in South Dakota. Warm water fish species (largemouth bass, catfish, sunfish) as well as those preferring cooler water (walleye, pike, smallmouth bass) are present throughout South Dakota lakes, streams, and rivers. Many of these species are tolerant of temporary increases in total suspended solids (TSS).

Rail line reconstruction activities could affect fisheries with an increase in TSS and loss of habitat. In addition, once the rail line is in operation, potential releases of petroleum products and right-of-way herbicide use could affect fish and mussels.

The impacts to fish and mussels during reconstruction would occur primarily as a result of increases in TSS. Increased TSS may affect fish populations by:

- preventing successful development of fish eggs and larvae,
- modifying natural movements and migrations,
- reducing the abundance of food,
- clogging and abrading gills, and
- altering available habitat.

If waterway reconstruction activities were to take place near a fish spawning site during or immediately after spawning, increased TSS from disturbance to bottom sediments and erosion could result in reduced survival of eggs and fry. In addition, increases in TSS could cause fish to migrate out of sections of the river temporarily. In-stream work for replacement of bridges and culverts, stream channelization, and bank stabilization activities could alter or destroy aquatic habits. Disturbance to bottom substrates could eliminate gravel beds at the site or downstream due to sedimentation. Removal of debris, channelization, and stabilization would reduce structure and cover in the stream. Alteration of riffle, run, and pool areas could occur from channelization and stabilization in the immediate area of stream crossings, reducing stream habitat diversity and the habitat for species using these areas.

Mussel populations downstream of reconstruction locations, particularly sites of bridge or culvert replacement, would be susceptible to increased TSS. Individuals or entire beds could be lost from reduction in food, damage to gills, or being silted over with sediment. If mussels occur in areas of in-stream work, loss of individuals would be expected from reconstruction equipment and activities within the stream.

The impacts to fish and mussels from rail line operations would occur primarily in the unlikely event of a fuel or chemical spill, or herbicide applications to the right-of-way. The impact of a fuel or chemical spill on fish would depend on the type and quantity of the chemical spilled, the dispersion in the river or lake, fish present in the spill area, and the clean-up procedures employed. The primary commodity carried by DM&E trains would be coal which is relatively inert and non-toxic. A derailment and spill of coal into an area stream would likely result in an increase in TSS and potential impacts associated with such an increase as previously discussed. The only fuel or chemicals that would be carried by coal trains are those that are needed for the operation of the train. Small fish and aquatic invertebrates would be the most sensitive to any chemical spills. Overall, the improved condition of DM&E's rail line would reduce the potential for derailments that could result in release of hazardous materials. No changes in the quantity of hazardous materials shipped would occur and the improved condition of the rail line would reduce the likelihood of a derailment and subsequent spill.

The impacts from the use of herbicides to maintain the right-of-way would be dependent on the type and quantity of the herbicide used. Impacts from herbicide use would be minimized by employing proper application procedures and by using herbicides labeled as being non-toxic to aquatic organisms.

Missouri River Bridge

It is unlikely that fish or aquatic life would be impacted by the rehabilitation of the existing bridge over the Missouri River. Reinforcement of existing piers could cause minor disturbance to bottom sediments and thus locally increase TSS. Materials removed or replaced on the existing bridge could be accidently dropped to the river below and would serve as structure for fish and other aquatic life. It is possible that hazardous chemicals could be accidently discharged during bridge reinforcement. However, limited equipment would be on the bridge itself and the equipment present would contain only the amount of fuel and lubricant necessary for its operation. Safe handling and adherence to regulatory procedures will help prevent an accidental discharge in to the river.

During rail operations, use of the track could result in a derailment or spill releasing coal or petroleum products that could damage fish or aquatic life. The likelihood of this occurring is minimal, as the new rail line would be safer than the existing conditions of the track.

If the building of a new bridge is the option chosen, impacts to fish and aquatic life would likely be greater than those associated with reinforcing the existing bridge. The construction of the bridge would require in-stream work to place new bridge piers. Such work would likely result in an increase in TSS. Degradation of aquatic habitat would occur during pier construction. If

the bridge construction occurred while fish were spawning, sediment disturbance could cause some loss of eggs and young. In addition, mussels and other aquatic life could also be impacted, as previously discussed during bridge construction, if sediment levels were to increase. Such increases would only be expected during construction of piers which should be limited to one construction season. During this time, increased TSS would only be expected for a short distance downstream of the construction area due to the large volume of water and its flowing nature at the bridge location. Other construction related impacts would be similar to those of bridge reconstruction, including accidental dropping of construction material and release of hazardous materials. Construction impacts would be short-term, and should not result in significant impacts to aquatic life.

The operation impacts should be similar to those occurring at this time with the existing bridge. Additional piers would also provide additional structure for fish and opportunities for fishing locations. However, increased use of the rail line could increase the likelihood of an accidental discharge of hazardous materials that may impact fisheries. However, as discussed in the previous Section, the new rail line would be safer and the likelihood of a derailment minimal.

If the existing bridge would require removal subsequent to the potential construction of a new bridge, impacts to water quality would be similar to those which would occur during construction activities. Pier removal and abutment work may cause temporary increases in TSS and sedimentation.

4.3.10.4 Endangered, Threatened and Sensitive Species

Potential impacts to Federally listed endangered or threatened species, species proposed for listing, candidate species, and species with special status recognized by the USFWS could include:

- The death of individuals of the species.
- Reduced recruitment and/or survival of individuals, slowing the species' recovery or expansion of current populations.
- Loss of Federally designated critical habitats.
- Loss of known habitat
- Contribute to other causes of species decline resulting in an unlisted species, particularly a candidate or species of concern, warranting consideration for or being proposed for listing as Federally threatened or endangered.

Impacts on Federally listed species were considered and evaluated if the species potentially occurs in the vicinity of any proposed alternative. The species would be considered potentially impacted by the project if any alternative could result in:

- Direct mortality of individuals.
- Long-term or permanent loss or alteration of existing or potential habitat necessary for the life history functions (breeding, wintering, or migration) of one or more threatened or endangered species.

The following Section discusses the Federally listed species potentially affected by reconstruction of the existing rail line in South Dakota. These species include the Topeka shiner, American burying beetle, bald eagle, piping plover, interior least tern, and pallid sturgeon.

4.3.10.4.1 Topeka Shiner

The existing rail line crosses 41 streams known or potentially containing Topeka shiners. During reconstruction of bridges and culverts at these stream crossings, Topeka shiners at the crossing and downstream could be adversely affected should erosion or disturbance of bottom sediments increase TSS. In-stream work may also damage or destroy suitable shiner habitat at the crossing. If petroleum products were accidentally discharged into aquatic environments, Topeka shiner populations could be affected if individuals are harmed or killed. Short-term impacts could also occur during reconstruction due to runoff from reconstruction sites near waterways increasing stream sedimentation.

During operation, derailments and accidental releases of diesel fuels and other petroleum products into streams and rivers containing Topeka shiners could harm shiner populations. Spills of coal could increase TSS. Impacts would be most likely if potential discharge sites are at or within 500 feet of surface waters containing shiners where there may be insufficient riparian vegetation to prevent flows from entering drainages. However, derailments are considered by DM&E to be unlikely because of the improved condition of the rail line following reconstruction.

4.3.10.4.2 American Burying Beetle

American burying beetle habitat may be disturbed or lost during reconstruction and operation of the rail line. Surveys in the proposed project area for the American burying beetle have not been conducted; therefore it is unknown if American burying beetle populations exist. Although not documented in the vicinity of the existing rail line in South Dakota, American burying beetles could occur in suitable soils, including those with high sand content, high erosion hazard, and those with relatively well developed topsoil such as prime farmland, but not subject to

irrigation and/or cultivation. The most likely impacts would occur during reconstruction. Earthmoving and excavation activities resulting in soil disturbance and compaction would likely kill any beetles buried in the soil. Once reconstruction is completed, it is unlikely the right-of-way would be suitable habitat for the beetle due to soil disturbance, compaction, and conversion to rail line right-of-way.

Attraction to, disorientation from, and subsequent injury or death due to artificial lights which are known to attract and disorient many species of nocturnal insects, could occur if reconstruction takes place at night and American burying beetles occur along the existing rail line. Security lighting may also have similar affects.

If artificial lights are placed along the rail line as part of rail line and facilities operation, American burying beetles could be attracted to the lights and become disoriented. Carrion on the rail line could attract burying beetles, resulting in them potentially being struck by passing trains. However, rail line operations are not expected to have any impact on the American burying beetled due to its questionable occurrence along the rail line.

4.3.10.4.3 Bald Eagle

Since bald eagles tend to avoid human activities during all times of the year, reconstruction activities could temporarily displace eagles during their migration, wintering, and nesting periods. However, the existing rail line passes through little bald eagle habitat. No bald eagle nests are known along the existing rail line in South Dakota. Potential bald eagle habitat in South Dakota along the existing rail line consists of potential wintering habitat and roosting areas in the Pierre area and along the Bad River. As most reconstruction activities would be limited to outside the winter period, only the minimal loss of some trees suitable as bald eagle wintering roost sites or perching sites removed during reconstruction would affect wintering eagles. As clearing would occur when eagles were absent, it is expected to have little if any affect on them.

Bald eagles are known to congregate along the Missouri River below Lake Oahe, downstream of Pierre. Open water and an availability of fish and waterfowl likely draw eagles to this area. Since wintering bald eagles in some areas feed on big game carrion, eagles in the Pierre area may be drawn to carrion along the rail line during rail line operation, particularly the young that are less experienced hunters. These individuals may take advantage of carrion along the rail line and may suffer injury or direct mortalities if struck by a passing train. It is unlikely that slow moving construction vehicles would inadvertently kill eagles feeding on carcasses, but personal vehicles driven to and from construction sites are more likely to kill eagles feeding on road killed carrion.

4.3.10.4.4 Piping Plover

The piping plover occurs within the project area along the Missouri River. Noise disturbance during reconstruction of the rail line or the Missouri River bridge could affect nesting piping plovers. However sandbars and other suitable nesting areas are not known within proximity to the existing rail line or bridge over the river. Petroleum spills could affect aquatic invertebrates which plovers rely on for food. However, this impact would be unlikely due to such materials being stored away from waterways and only limited quantities being at construction sites.

The potential operation and maintenance activities could result in spills of coal, hazardous materials, or herbicides into the river that could reduce or contaminate plover food supplies. However, as noted above, only limited quantities of these materials would likely be spilled and derailments would be unlikely due to the improved condition of the rail line.

4.3.10.4.5 Interior Least Tern

Interior least terns are known to occur within the project area along the Missouri River. Short-term impacts could occur to nesting terns during construction. Because their habits are similar to piping plovers, project reconstruction and operation impacts would be similar to those discussed for piping plovers.

4.3.10.4.6 Pallid Sturgeon

Missouri River Bridge Impacts

Pallid sturgeons are known to occur in the Missouri River downstream of the existing DM&E bridge over the river. This species could be adversely affected if petroleum products were accidentally discharged into waterways during either reinforcement of the existing bridge or construction of a new bridge. An accidental discharge of these materials would be toxic to algae, invertebrates, and fish, reducing the sturgeon's food sources. Increased TSS during new bridge construction could also reduce sturgeon forage. However, rehabilitation or construction and operation of the bridge should not significantly impact the pallid sturgeon or its habitat.

4.3.11 TRANSPORTATION

Chapter 4, Section 4.1.9 gives a detailed description of the transportation facilities in the project area. Reconstruction activities would have temporary, short-term impacts on existing transportation systems, including Federal, state, county and private roads. These impacts would

result from the transportation of materials and crews to work sites and reconstruction activities occurring at existing grade crossings. Transportation of materials in heavy trucks and movement of construction equipment could accelerate wear and tear on local highways. Rural roadways and bridges incapable of supporting construction traffic would require upgrading for safe transportation. Existing road crossings, both grade and grade separated, may require closure and associated detours during reconstruction of the crossing. These closures would reroute normal traffic patterns, potentially increasing traffic and congestion in residential areas and on low volume roadways. Partial closures of grade crossings, such as one direction of traffic, during reconstruction would cause delays to motorists at that particular crossing. Additionally, routes for emergency vehicle response would have to be redesigned to avoid closed roadways. Pedestrian traffic would also be impacted at crossings where sidewalks and other pedestrian ways are provided. These routes would also need to be modified to avoid closures, this would prevent pedestrians from adding significant distances to their daily commutes. Based on DM&E's estimate of reconstructing approximately 1.0 mile of rail line per day, any crossing closures or delays would be temporary, lasting only from a day or two to possible a week, depending on the complexity of the crossing.

Reconstruction activities could impact rail traffic, both on the existing DM&E system and the systems of other rail carriers. DM&E has indicated that reconstruction would occur in such a manner as to maintain rail service along its existing rail line. Some delays to trains may occur due to conflicts with reconstruction activities, but no significant impacts are anticipated. Additionally, reconstruction of the DM&E rail line could impact rail operations of other rail carriers due to delays in traffic to be interchanged and reconstruction of rail/rail crossings. Should DM&E experience train delays due to reconstruction, interchanging rail carriers could also experience delays due to crews waiting for trains and rail schedules being altered. While some impacts would likely occur, they should not significantly impact the overall operations of interchanging rail carriers. During reconstruction of the existing crossings of other rail carriers, trains using these crossings may be delayed or rerouted to avoid the crossing. Coordination between the railroads would be imperative to maintain safe rail operations and allow construction activities to occur in a manner least disruptive to either railroad. Some impacts are expected, although they are not expected to be significant, particularly since maintaining safe and efficient rail operations is in the best interest of DM&E and other rail carriers potentially involved.

To analyze the effects of the increased rail traffic on vehicle delays at existing highway/rail crossings, SEA identified crossings along the DM&E system at which the average daily traffic (ADT) would exceed 5,000 vehicles. An ADT less than 5,000 SEA determined would have relatively few drivers who would experience the potential effect of increased train traffic and the associated additional vehicle delay would be minimal. SEA calculated potential changes in vehicle delay at these crossings.

In order to analyze the effects of the proposed reconstruction on the roadway system at existing public highway/rail grade crossings, SEA analyzed the crossings for three proposed levels of operation; 20 MNT, 50 MNT and 100 MNT for train lengths of both 6,400 feet (115 rail cars) and 7,400 feet (135 rail cars). SEA calculated potential changes in vehicle delay at those crossings where ADT volumes are 5,000 or greater. SEA categorized crossings based on the level of service. Levels of service ranged from free-flowing to severely congested and were quantified as shown in Table 4.3-21:

Table 4.3-21
Grade Crossing Levels of Service

Level of Service	Average Total Delay (sec/vehicle)
A	≤5
B	>5 and ≤10
C	>10 and ≤20
D	>20 and ≤30
E	>30 and ≤ 45
F	>45

As part of the transportation analysis, SEA determined the time each crossing would be blocked per train crossing event. This time included the time for warning structures to be deployed, the train to pass, and time for warning structures to be restored after the train has passed.[13] Because train passing time is dependent on train speed and trains would generally be operating at speeds ranging from 45 to 49 miles per hour, SEA conservatively used 45 miles per hour for all calculations concerning vehicle delay. Crossings were estimated to be blocked 2.1 minutes for 115-car trains and 2.4 minutes for 135-car trains. For those crossings DM&E indicated speed restrictions would be imposed, the appropriate speed for the crossing was used to determine the delay time. SEA's methodology for calculating vehicle delay, crossing data considered in the analysis, detailed description of levels of service, and criteria of significance are provided in Appendix G. Significant impacts to traffic from the project were determined by SEA to result from either:

[13] For crossings with passive warning devices, SEA conservatively used the same blocked crossing time per train passing event as active warning devices.

- an average 30 second increase in vehicle delay, level of service rated E or F regardless of the existing condition, or

- a reduction of existing level of service of C or better to a level of D or worse due to the project.

SEA identified two counties in South Dakota with public highway/rail grade crossings meeting the criteria for performing vehicle delay calculations. These are Beadle, and Hughes Counties. The results of SEA's analysis are summarized below. Appendix G contains the data for SEA's calculations.

Beadle County

20 MNT, 6,400 & 7,400 Feet

Two crossings analyzed in Beadle County, in the town of Huron, Dakota Avenue (FRA ID No. 189698H, MP 362.80) and Lincoln Avenue (FRA ID No. 189701N, MP 363.80), would experience reductions in delay per stopped vehicle due to increased train speed. The levels of service under reconstruction condition would be A. Both crossings would experience a reduction in maximum vehicle queue length. The average decrease in maximum vehicle queue in the County would be 6 cars per day. The average reduction in stopped delay would be 0.5 minute per vehicle.

50 MNT, 6,400 & 7,400 Feet

Two crossings analyzed in Beadle County, in the town of Huron, Dakota Avenue (FRA ID No. 189698H, MP 362.80) and Lincoln Avenue (FRA ID No. 189701N, MP 363.80), would experience reductions in delay per stopped vehicle. The levels of service under the reconstruction condition would be A for the 6,400 feet train scenario and B for the 7,400 feet scenario. Both crossings would experience a reduction in maximum vehicle queue length. The average decrease in maximum vehicle queue in the County would be 6 cars per day. The average reduction in stopped delay would be 0.5 minute per vehicle.

100 MNT, 6,400 & 7,400 Feet

Two crossings analyzed in Beadle County, in the town of Huron, Dakota Avenue (FRA ID No. 189698H, MP 362.80) and Lincoln Avenue (FRA ID No. 189701N, MP 363.80), would experience reductions in delay per stopped vehicle due to increased train speeds. The levels of service under reconstruction conditions would be B for the 6,400 feet train scenario and C for the 7,400 feet scenario. All crossings would experience a reduction in maximum vehicle queue

length. The average decrease in maximum vehicle queue in the County would be 6 cars per day. The average reduction in stopped delay would be 0.5 minutes per vehicle.

Hughes County

20 MNT 6,400 & 7,400 Feet

Three crossings analyzed in Hughes County, in the town of Pierre, Highway 14/34 (FRA ID No. 189846A, MP 481.10), Highland Avenue (FRA ID No. 189848N, MP 481.60), and Central Street (FRA ID No. 189850P, MP 481.90), would experience reductions in delay per stopped vehicle due to increased train speeds. The levels of service under reconstruction condition would be A. Both crossings would experience a reduction in maximum vehicle queue length. The average decrease in maximum vehicle queue in the County would be 5 cars per day. The average reduction in stopped delay would be 0.4 minute per vehicle.

50 MNT 6,400 & 7,400 Feet

Three crossings analyzed in Hughes County, in the town of Pierre, Highway 14/34 (FRA ID No. 189846A, MP 481.10), Highland Avenue (FRA ID No. 189848N, MP 481.60), and Central Street (FRA ID No. 189850P, MP 481.90), would experience reductions in delay per stopped vehicle due to increased train speeds. The levels of service under reconstruction condition would be A for the 6,400 feet train scenario and B for the 7,400 feet scenario. Both crossings would experience a reduction in maximum vehicle queue length. The average decrease in maximum vehicle queue in the County would be 5 cars per day. The average reduction in stopped delay would be 0.3 minute per vehicle.

100 MNT 6,400 & 7,400 Feet

Three crossings analyzed in Hughes County, in the town of Pierre, Highway 14/34 (FRA ID No. 189846A, MP 481.10), Highland Avenue (FRA ID No. 189848N, MP 481.60), and Central Street (FRA ID No. 189850P, MP 481.90), would experience reductions in delay per stopped vehicle due to increased train speeds. The levels of service under reconstruction conditions would be B for the 6,400 feet train scenario and C for the 7,400 feet scenario. Both crossings would experience a reduction in maximum vehicle queue length. The average decrease in maximum vehicle queue in the County would be 5 cars per day. The average reduction in stopped delay would be 0.3 minute per vehicle.

Because DM&E's trains would operate at generally greater speeds following rail line reconstruction than current speeds, trains would take less time to pass through a grade crossing. This would result in the reductions in vehicle delay and queue noted above. As such, none of the crossings SEA analyzed would meet SEA's criteria of significant impact. While SEA recognizes the increased train traffic would increase the likelihood motorists would encounter trains and be delayed, the delay would be less than what is currently experienced. SEA determined the proposed increase in rail line traffic would have no significant affect on vehicle traffic in South Dakota.

Emergency Vehicle Response

In many communities along the existing DM&E rail line police, fire, and emergency medical services or ambulance may be required to cross the rail line at grade crossings when responding to emergencies. The potential exists for emergency vehicles to be delayed at grade crossing blocked by a passing train. SEA analyzed the potential for emergency vehicle delay at grade crossings by looking at the nature of emergency responses, the nature of coal train schedules, the crossing delay per stopped vehicle, and the total daily crossing blockage time.

Emergency incidents are random and unpredictable. Where, when, and what the emergency is cannot be predicted. The incident could be a fire on the west of town, a car accident in the midtown area or a burglary in a rural area. Each emergency incident requires different services to respond. A car accident may require police, fire and ambulance, whereas a burglary would only require police response. A timely emergency response may only be necessary in one direction. During a fire or police emergency, delay would only be a factor for travel to the emergency. Equipment delayed returning from the incident would have little, if any impact on safety as the emergency would be over. An exception could be that if fire equipment would be delayed returning to the station, restoring equipment to respond to the next emergency would also be delayed, potentially reducing the ability to respond to a second emergency if it occurred shortly after the first.

Additionally, not all emergency responses are actually emergencies. Of medical emergencies, only from 25 percent (Transportation Research Board 1987) to 5 to 10 percent (Los Angeles County-wide Coordinating Council on Emergency Medical Services 1975) are actually life-threatening. Life threatening medical emergencies are reduced to as little as one percent following on site medical treatment. Only these remaining emergencies would be susceptible to delay in two directions, traveling to the emergency and then to the hospital. Because emergency medical vehicles may be based at fire stations or other non-hospital locations, or may be dispatched while away from the hospital, emergency vehicles responding to an incident could utilize different routes when responding than when transporting a patient to a hospital. Likewise,

an emergency vehicle could be directed to use a less direct route to an incident, with better road conditions, in favor of a more direct route with poor road conditions or heavy traffic, depending on the emergency. Therefore, the emergency vehicle may only cross the rail line once during an emergency response.

Determining the consequences of delays to emergency vehicles is further complicated by the time sensitivity of emergency patients to treatment. A study reported by the National Research Council, Transportation Research Board (TRB) reported that only 0.11 percent of emergency patients require prompt emergency room treatment. In this study, "prompt" was defined as on-site treatment within 15 minutes of symptoms or injury and emergency room treatment within 70 minutes. The study also determined that patients in life threatening emergencies would become critical if some treatment was not administered within 30 minutes. The TRB went on to recognize the importance of the patients condition and elapsed time prior to treatment. In recognizing the importance of elapsed time, the TRB pointed out that the closer a patient is to emergency treatment, the less consequential any delay would be to their condition. They indicated " a 5 minute delay at a crossing would not affect patient outcome if the patient is located less than 10 minutes from the ambulance station. On the other hand, if the patient were located almost 15 minutes from the station, a delay of only 1 minute could be critical". TRB did not indicate the consequences of delay when transporting critical patients to a hospital. However, it appears that delay is most critical to medical emergencies when traveling to the emergency.

Further complicating the analysis is that not only are emergency events random, but so are train passings. Freight train schedules are dependent on shippers' needs for transportation. Therefore they may not occur on regular schedules; at consistent times of the day, week, or month. For this project, coal train schedules would be subject to availability at the mine for loading, time for crew changes, fueling, inspections, and access to a particular stretch of rail line. All these make it difficult to predict passing freight train events. The randomness of train events complicates emergency vehicle response. When an emergency call is received the dispatcher does not know whether to expect a train or not. Thus they are unable to identify a route to avoid a passing train unless a grade separation is available and provides the most appropriate route to the emergency. In following the identified route for response, the emergency vehicle may:

- not encounter a train and pass undelayed through the crossing.

- arrive at a crossing just as the train arrives and be required to wait the entire time that the train is passing or detour to another unblocked crossing. Should the emergency vehicle chose to wait, it would likely experience reduced traffic on the other side of the crossing as traffic would have cleared while the train was passing.

Selecting a detour may result in the emergency vehicle experiencing delay along its entire route due to negotiating traffic.

- arrive during the train crossing. Under this circumstance, the emergency vehicle could utilize the oncoming traffic lane to approach the crossing, avoiding any vehicle queue. After the crossing cleared, it could proceed through the crossing ahead of queued vehicles into the appropriate lane of traffic which would have cleared during the passing train.

- arrive shortly after the train has passed, but before traffic flow had been restored to normal. Under this scenario, the emergency vehicle would likely be required to slow down to make its way through traffic.

Based on these scenarios, and minimum train speeds of 40 mph (only applies to crossings with speed restrictions, other crossing would have train speeds of 45 to 49 mph), the most an emergency vehicle would be expected to be delayed would be 2.6 minutes (Table 4.3-22). This represents the crossing delay per stopped vehicle at 40 mph. The crossing delay per stopped vehicle, or total blocked time per train is the longest amount of time a driver would have to wait at a grade crossing to let a train pass. The amount of time a crossing is blocked is based on the length of the train and the speed of travel. The faster a train is moving, the less time the crossing would be blocked (Table 4.3-22). The shorter the train, the less time the crossing is blocked. All existing DM&E grade crossing in South Dakota at all operational levels, would experience a decrease in delay per train event from the existing condition. Delay would range from none, to that similar to negotiating a stop light at a busy intersection to the maximum of 2.6 minutes.

Table 4.3-22
Grade Crossing Delays in Minutes
at Various Train Velocities and Train Lengths

Train Velocity: mph / feet per minute	115 car Train	135 car Train
	minutes of delay	minutes of delay
5 / 440	15.0	17.3
10 / 880	7.8	8.9
15 / 1320	5.3	6.1
20 / 1760	4.1	4.7
25 / 2200	3.4	3.9

Table 4.3-22
Grade Crossing Delays in Minutes at Various Train Velocities and Train Lengths

Train Velocity: mph / feet per minute	115 car Train	135 car Train
	minutes of delay	minutes of delay
30 / 2640	2.9	3.1
35 / 3080	2.6	2.9
40 / 3520	2.3	2.6
45 / 3960	2.1	2.4
49 / 4312 (Max. Speed)	2.0	2.2

Total daily crossing blockage time could be used as an indicator of the risk of delay at a grade crossing. It influences the likelihood that a crossing would be blocked when an emergency vehicle would need to cross the tracks. This measurement is obtained by multiplying the crossing delay per stopped vehicle by the number of trains per day, giving the total minutes the crossing would be blocked each 24 hour or 1,440 day (Table 4.3-23).

Table 4.3-23
Total Time Per Day Crossings are Blocked at Various Velocities, under Various Operation Levels

Train Velocity: mph/feet per minute	Train length: 115 car			Train length: 135 cars		
	Total minutes delay with 11 trains per day	Total minutes delay with 21 trains per day	Total minutes delay with 37 trains per day	Total minutes delay with 11 trains per day	Total minutes delay with 21 trains per day	Total minutes delay with 37 trains per day
20 / 1,760	45.1	86.1	151.7	51.7	98.7	173.9
25 / 2,200	37.4	71.4	125.8	42.9	81.9	144.3
30 / 2,640	31.9	60.9	107.3	34.1	65.1	114.7
35 / 3,080	28.6	54.6	96.2	31.9	60.9	107.3
40 / 3,520	25.3	48.3	85.1	28.6	54.6	96.2
45 / 3,960	23.1	44.1	77.7	26.4	50.4	88.8
49 / 4,312	22.0	42.0	74.0	24.2	46.2	81.4

The majority of the existing DM&E rail line in South Dakota closely parallels State Highway 14. Proximity to a highway could facilitate emergency vehicles finding an open grade crossing when the preferred route is blocked. In the event of an emergency vehicle finding a grade crossing blocked, it could precede to the front of the line in order to be the first to cross once the crossing is clear. In more rural areas, increased vehicle speed on rural roads with low traffic volumes could be used to reduce response time. Based on an anticipated speed of primarily 45 mph (Table 4.3-21) for DM&E traffic following reconstruction, delays for emergency equipment at the majority of grade crossings on the existing rail line would be brief. However, this delay could be significant when responding to emergencies in rural areas where response times to the site would be greater, as discussed above. While any delay would be less than that emergency vehicles could currently experience based on existing train speeds, the increased number of trains would increase the likelihood of emergency vehicles encountering a train. Slower trains could enable emergency vehicles to travel greater distances to detour around the train. However, faster train speeds would require emergency vehicles to arrive at an open crossing quicker to safely cross the rail line unless proceeding to a crossing through which the train had already passed.

There would be 16 grade crossings on the existing rail line in South Dakota where speeds would be restricted to 40 mph. The Commercial Street / US 281 crossing near Wosley would have a speed restriction of 40 mph due to curves in the track. Likewise, 15 crossings in Pierre, and Fort Pierre would have 40 mph restrictions to allow for crossing the Pierre Bridge over the Missouri River. Delays at crossings with 40 mph restrictions would be slightly longer than those at 45 mph (Table 4.3-22).

Because total daily blocked crossing time would be increased (Table 4.3-23), SEA determined the likelihood of an emergency vehicle responding to an emergency encountering a train would be increased. However, the overall significance of any delay is difficult to determine due to the numerous factors involved and discussed above.

Missouri River Bridge Impacts

Rehabilitation of the existing bridge would result in no changes to the operations of trains over the Missouri River. Although the rehabilitated bridge may be able to accommodate increased train speeds and car weights, the curvature of the approach to the east side of the bridge would not enable speeds to be increased. Construction of a new bridge would require minor realignment of the existing rail line to connect with the new bridge which could enable a reduction of the approach curves and allow for increased train speed. In the event of new bridge construction, rail line traffic would continue to use the existing bridge until the new bridge was placed into service.

4.3.12 SAFETY

The proposed project has the potential to impact vehicle safety at grade crossings, pedestrian safety at designated crossings and along the rail line, and train safety. These impacts could occur during both reconstruction and operation of the project.

During reconstruction at grade crossings, delays and detours for vehicles could be increased. Motorists using these crossings could become frustrated with the conditions and try to cross during reconstruction, beat trains to avoid delay at other grade crossings, or increase speeds along detour routes. These actions, combined with increased traffic congestion along detour routes could result in unsafe conditions for motorists and pedestrians, resulting in increased vehicle/vehicle and vehicle/pedestrian accidents.

Pedestrians may also become frustrated with increased inconvenience from walking further distances and continue to cross at closed crossings, walk along the rail line right-of-way, or cross at unauthorized locations. These actions could result in injury to pedestrians from reconstruction related activities or rail traffic. Additionally, the presence of reconstruction equipment and materials could attract children who could be injured playing around reconstruction sites. Based on DM&E's estimate of reconstructing approximately 1.0 mile of rail line per day, any reconstruction activities at grade crossings would be temporary, lasting only from a day or two to possibly a week, depending on the complexity of the crossing.

During reconstruction, rail safety would be a continual concern. Reconstruction activities could damage the track or incomplete reconstruction could lead to derailments. Prior to operation of trains following reconstruction activities, rail bed and track should be inspected for defects to help reduce the likelihood of derailments. Appropriate coordination between reconstruction and train crews would be important to maintain a safe working environment.

Increased train activity following rail line reconstruction could affect the safety of roadway users at highway/rail grade crossings. To address potential changes in accident frequency, SEA compared existing accident frequency rates with rates at all highway/rail grade crossings that would experience an increase in train traffic following rail line reconstruction. SEA evaluated the accident potential along the entire DM&E rail line in South Dakota at locations where the rail line crosses public roadways grade. This included all of the grade crossings along the existing DM&E rail line from Wall east to the South Dakota/Minnesota border. At these locations, SEA looked at the most recent five years of accident history available, and calculated the potential change in the number of years between accidents. SEA's analysis procedure considered the type of existing warning devices at the highway/rail grade crossings, including passive devices (signs or crossbucks), flashing lights, or gates, ADT at the crossing, and train speed for the crossing. SEA

did not analyze grade-separated crossings because these crossings eliminate the potential for train-vehicle accidents by physically separating the roadway from the railroad track.

To evaluate the significance of potential changes in accident frequency in South Dakota, SEA categorized highway/rail grade crossings into two categories:

Category A

Category A consisted of highway/rail grade crossings with relatively frequent train-vehicle accidents predicted. SEA considered highway/rail grade crossings in South Dakota with accident frequency rates at or above the states 50th highest rate of one accident every 20 years (0.051 accident frequency rate) to be Category A highway/rail grade crossings. For all Category A highway/rail grade crossings, SEA considered the relatively small accident frequency rate increase of one additional accident every 100 years (a 0.01 accident frequency rate increase) to be significant.

Category B

Category B consisted of highway/rail grade crossings with relatively few train-vehicle accidents predicted. SEA considered highway/rail grade crossings in South Dakota with accident frequency rates less than one accident every 20 years (less than 0.051 accident frequency rate) to be Category B highway/rail grade crossings. For these crossings, SEA considered an accident frequency rate increase of one additional accident every 20 years (a 0.05 accident frequency rate increase) to be significant.

SEA identified public grade crossings in each county through which the existing DM&E rail line would pass. SEA analyzed the potential changes in accident frequency at each of these crossings and determined the overall change in accident frequency for each county. The existing public highway/rail grade crossings in each county were analyzed at the 20 MNT, 50 MNT and 100 MNT levels of operation for each of the proposed Extension Alternatives (Alternatives B, C and D). Each grade crossing was analyzed for each Extension Alternative due to the siding plan required for the existing rail line differing for each Extension Alternative. As the presence of multiple sets of tracks at a crossing has an influence on the safety of the crossing, SEA needed to consider each grade crossing under each Extension Alternative as a particular crossing may have a siding track and the rail line under one Extension Alternative, but only the rail line under another Extension Alternative. Because accident frequency increases as train speed increase, SEA conservatively use the maximum operating speed indicated by DM&E, 49 miles per hour, for all safety calculations. However, loaded eastbound coal trains would generally be traveling at 45 miles per hour and trains operating on sidings would average approximately 40 miles per hour.

At those crossings where speed restrictions would be implemented, the maximum speed used in SEA's analysis was the maximum allowable speed for the particular crossing.

The results of SEA's analysis are summarized below. The results presented below apply to all Extension Alternatives unless it is noted otherwise. Appendix H contains the data for SEA's calculations and the results of SEA's analysis for each crossing.

Brookings County

20 MNT

SEA's safety analysis showed that for the 43 public highway/rail grade crossings studied in Brookings County,[14] the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.001 to 0.010. This translates into a range of increase from one accident every 1,498 years to one accident every 101 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several crossings for the reconstruction case, resulting in a system-wide change in accident frequency in Brookings County of 0.098. This represents a predicted increase of one accident every 10 years in the county. A total of 3 accidents occurred at crossings in the County between 1993 and 1997.

50 MNT

SEA's safety analysis showed that for the 26 public highway/rail grade crossings studied in Brookings County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.003 to 0.026. This translates into a range of increase from one accident every 394 years to one accident every 38 years, respectively. SEA determined that the predicted increases resulting from the proposed increases in rail traffic was significant at crossings Elk Street (FRA ID No. 193786A, MP 274.40), and 459th Ave. (FRA ID No. 197448R, MP 302.80). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Brookings County is 0.342. This represents a predicted increase of one accident every 3 years in the County.

[14] Excludes grade grossing evaluated as part of the Brooking Bypass. SEA's evaluation of these crossings can be found in Section 4.9.

100 MNT

SEA's safety analysis showed that for the 26 public highway/rail grade crossings studied in Brookings County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.005 to 0.045. This translates into a range from 1 accident every 210 years to 1 accident every 22 years, respectively. SEA determined that the predicted increases resulting from the proposed construction was significant at crossings Elk Street (FRA ID No. 193786A, MP 274.40), 459th Ave. (FRA ID No. 197448R, MP 302.80), and State Highway 13 (FRA ID No. 193789V, MP 274.80). These highway/railroad grade crossings are classified at Category A. SEA found the predicted increases at other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Brookings County is 0.588. This represents a predicted increase of one accident every 2 years in the County.

Kingsbury County

20 MNT

SEA's safety analysis showed that for the 45 public highway/rail grade crossings studied in Kingsbury County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.0012 to 0.018. This translates into a range of increase from 1 accident every 861 years to one accident every 56 years, respectively. SEA determined that the predicted increases resulting from the proposed increase in rail traffic was significant for all of the Extension Alternatives at crossings 450th Ave. (FRA ID No. 197508X, MP 312.60), Main Street (FRA ID No. 197521L, MP 321.00), Calumet Ave. (FRA ID No. 197456H, MP 329.70) and additionally at 441st Ave. (FRA ID No. 197523A, MP 321.70) for Alt. D. These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Kingsbury County is 0.252. This represents a predicted increase of one accident every 4 years in the County.

50 MNT

SEA's safety analysis showed that for the 45 public highway/rail grade crossings studied in Kingsbury County, the predicted increases in accident frequency at the 50 MNT level of operation

would range from 0.0025 to 0.036. This translates into a range of increase from 1 accident every 396 years to 1 accident every 28 years, respectively. SEA determined that the predicted accident increases resulting from the proposed increases in rail traffic were significant at crossings 450th Ave. (FRA ID No. 197508X, MP 312.60), Main Street (FRA ID No. 197521L, MP 321.00, Calumet Ave. (FRA ID No. 197456H, MP 329.70), Lake Ave. (FRA ID No. 197520E, MP 320.90), 441st Ave. (FRA ID No. 197523A, MP 321.70), and Lyle Ave. (FRA ID No. 197685C, MP 329.30). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Kingsbury County is 0.536. This represents a predicted increase of one accident every 2 years in the County.

100 MNT

SEA's safety analysis showed that for the 45 public highway/rail grade crossings studied in Kingsbury County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.004 to 0.053. This translates into a range of increase from 1 accident every 241 years to 1 accident every 19 years, respectively. SEA determined that the predicted increases resulting from the proposed increase in rail traffic would be significant at crossings Main Street (FRA ID No. 197452F, MP 308.20), 4th Street N. (FRA ID No. 197454U, MP 308.40), Park Ave. (FRA ID No. 197519K, MP 320.70), Prairie Ave. (FRA ID No. 197686J, MP 330.40), Ottawa Street (FRA ID No. 197697W, MP 344.60), 450th Ave. (FRA ID No. 197508X, MP 312.60), Main Street (FRA ID No. 197521L, MP 321.00), Calumet Ave. (FRA ID No. 197456H, MP 329.70), Lake Ave. (FRA ID No. 197520E, MP 320.90), 441st Ave. (FRA ID No. 197523A, MP 321.70), and Lyle Ave. (FRA ID No. 197685C, MP 329.30). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other crossing locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Kingsbury County is 0.813. This represents a predicted increase of one accident every 1.2 years in the County.

Beadle County

20 MNT

SEA's safety analysis showed that for the 39 public highway/rail grade crossings studied in Beadle County, the predicted increases in accident frequency at the 20 MNT level of operation

would range from 0.001 to 0.032. This translates into a range of increase from 1 accident every 696 years to 1 accident every 32 years, respectively. SEA determined that the predicted increases resulting from the proposed rail traffic increase would be significant at crossings US Highway 14 (FRA ID No. 189702V, MP 364.70), 394th Ave (FRA ID No. 189707E, MP 369.00), Commercial Ave. (FRA ID No. 189716D, MP 376.20), and Wessington Street (FRA ID No. 189731F, MP 387.50). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Beadle County is 0.213. This represents a predicted increase of one accident every 5 years in the County.

50 MNT

SEA's safety analysis showed that for the 39 public highway/rail grade crossings studied in Beadle County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.003 to 0.052. This translates into a range of increase from one accident every 333 years to one accident every 19 years, respectively. SEA determined that the predicted increases resulting from the proposed increase in rail traffic would be significant at crossings Dakota Ave. (FRA ID No. 189698H, MP 362.80), Lincoln Ave. (FRA ID No. 189701N, MP 363.80), US Highway 14 (FRA ID No.189702V, MP 364.70), 394th Ave (FRA ID No. 189707E, MP 369.00), Commercial Ave. (FRA ID No. 189716D, MP 376.20), and Wessington Street (FRA ID No. 189731F, MP 387.50). These highway/rail grade crossings are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Beadle County is 0.440. This represents a predicted increase of one accident every 2 years in the County.

100 MNT

SEA's safety analysis showed that for the 39 public highway/rail grade crossings studied in Beadle County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.003 to 0.076 for Extension Alternative B and 0.005 to 0.076 for Extension Alternatives C and D. This translates into a range of increase from 1 accident every 302 years to 1 accident every 13 years for Alternative B and one accident every 205 years to one accident every 13 years for Alternatives C and D. SEA determined that the predicted increases resulting from the proposed rail traffic increases would be significant at crossings Simmons Ave. (FRA ID

No. 189696U, MP 362.20), and 374th Street (FRA ID No. 189732M, MP 387.70), Dakota Ave. (FRA ID No. 189698H, MP 362.80), Lincoln Ave. (FRA ID No. 189701N, MP 363.80), US Highway 14 (FRA ID No. 189702V, MP 364.70), 394th Ave (FRA ID No. 189707E, MP 369.00), Commercial Ave. (FRA ID No. 189716D, MP 376.20) and Wessington Street (FRA ID No. 189731F, MP 387.50). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Beadle County is 0.704. This represents a predicted increase of one accident every 1.4 years in the County.

Hand County

20 MNT

SEA's safety analysis showed that for the 29 public highway/rail grade crossings studied in Hand County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.0013 to 0.016 for Alternative B and 0.0013 to 0.015 for Alternatives C and D. This translates into a range of increase from 1 accident every 780 years to 1 accident every 61 years for Alternative B and from one accident every 780 years to one accident every 68 years for Alternative C and D. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Hand County is 0.135 for Alternative B and 0.128 for Alternatives C and D. This represents a predicted increase in the County of one accident every 7 years for Alternative B and one accident every 8 years for Alternatives C and D.

50 MNT

SEA's safety analysis showed that for the 29 public highway/rail grade crossings studied in Hand County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.002 to 0.025. This translates into a range of increase from 1 accident every 426 years to 1 accident every 41 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Hand County is 0.230. This represents a predicted increase of 1 accident every 4 years in the County.

100 MNT

SEA's safety analysis showed that for the 29 public highway/rail grade crossings studied in Hand County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.004 to 0.034. This translates into a range of increase from 1 accident every 276 years to 1 accident every 29 years, respectively. SEA determined that the predicted increases resulting from the proposed increases in rail traffic would be significant at crossings at 3rd Street (FRA ID No. 189755U, MP 402.60) and Broadway Street (FRA ID No. 189756B, MP 402.90). These highway/rail grade crossings are classified as Category A. SEA found the predicted increases at other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Hand County is 0.345. This represents a predicted increase of 1 accident every 3 years in the County.

Hyde County

20 MNT

SEA's safety analysis showed that for the 14 public highway/rail grade crossings studied in Hyde County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.001 to 0.010. This translates into a range of increase from 1 accident every 780 years to 1 accident every 104 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Hyde County is 0.057. This represents a predicted increase of 1 accident every 18 years in the County.

50 MNT

SEA's safety analysis showed that for the 14 public highway/rail grade crossings studied in Hyde County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.002 to 0.017. This translates into a range of increase from 1 accident every

426 years to 1 accident every 60 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Hyde County is 0.102. This represents a predicted increase of 1 accident every 10 years in the County.

100 MNT

SEA's safety analysis showed that for the 14 public highway/rail grade crossings studied in Hyde County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.004 to 0.024. This translates into a range of increase from 1 accident every 276 years to 1 accident every 41 years, respectively. SEA determined that the predicted increases resulting from the proposed construction was significant at crossing Commercial Street FRA ID No. 789781J, MP 425.00). The highway/rail grade crossings is classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Hyde County is 0.153. This represents a predicted increase of 1 accident every 7 years in the County.

Hughes County

20 MNT

SEA's safety analysis showed that for the 23 public highway/rail grade crossings studied in Hughes County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.001 to 0.024. This translates into a range of increase from 1 accident every 859 years to 1 accident every 41 years, respectively. SEA determined that the predicted increases resulting from the proposed construction would be significant at crossings Wyman Ave. (FRA ID No. 189801T, MP 439.90), Industrial Road (FRA ID No. 189843E, MP 480.00) Harrison Street (FRA ID No. 189844L, MP 480.50) and Highway 14 (FRA ID No. 189846A, MP 481.10). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Hughes County is 0.224. This represents a predicted increase of 1 accident every 4 years in the County.

50 MNT

SEA's safety analysis showed that for the 23 public highway/rail grade crossings studied in Hughes County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.005 to 0.045. This translates into a range of increase from 1 accident every 196 years to 1 accident every 22 years, respectively. SEA determined that the predicted increases resulting from the proposed rail line traffic increase would be significant at crossings Lowell Road (FRA ID No. 189842X, MP 479.50), Monroe Street (FRA ID No. 189845T, MP 480.70), Highway 14 (189846A, MP 481.10), Ree Street (189847G, MP 481.40), Wyman Ave. (FRA ID No. 189801T, MP 439.90), Industrial Road (FRA ID No. 189843E, MP 480.00), and Harrison Street (FRA ID No. 189844L, MP 480.50). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Hughes County is 0.381. This represents a predicted increase of 1 accident every 3 years in the County.

100 MNT

SEA's safety analysis showed that for the 23 public highway/rail grade crossings studied in Hughes County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.002 to 0.066. This translates into a range of increase from 1 accident every 507 years to 1 accident every 15 years, respectively. SEA determined that the predicted increases resulting from the proposed rail traffic increases would be significant at crossings Wyman Ave. (FRA ID No. 189801T, MP 439.90), Industrial Road (FRA ID No. 189843E, MP 480.00), and Harrison Street (FRA ID No. 189844L, MP 480.50), Lowell Road (FRA ID No. 189842X, MP 479.50), Monroe Street (FRA ID No. 189845T, MP 480.70), Highway 14 (FRA ID No. 189846A, MP 481.10), Ree Street (FRA ID No. 189847G, MP 481.40), Highland Ave, (FRA ID No. 189848N, MP 481.60), and Central Street (FRA ID No. 189850P, MP 481.90). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Hughes County is 0.544. This represents a predicted increase of 1 accident every 2 years in the County.

Stanley County

20 MNT

SEA's safety analysis showed that for the 10 public highway/rail grade crossings studied in Stanley County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.003 to 0.019. This translates into a range of increase from 1 accident every 344 years to 1 accident every 53 years, respectively. SEA determined that the predicted increases resulting from the proposed increases in rail traffic would be significant at crossings 7th Ave. (FRA ID No. 189858U, MP 484.10) and Main Ave. (FRA ID No. 189861C, MP 484.60). These highway/rail grade crossing are classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Stanley County is 0.095. This represents a predicted increase of 1 accident every 11 years in the County.

50 MNT

SEA's safety analysis showed that for the 10 public highway/rail grade crossings studied in Stanley County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.0053 to 0.031. This translates into a range of increase from 1 accident every 190 years to 1 accident every 32 years, respectively. SEA determined that the predicted increases resulting from the proposed rail traffic increase would be significant at the 7th Ave. (FRA ID No. 189858U, MP 484.10) and Main Ave.crossings (FRA ID No. 189861C, MP 484.60). These highway/rail grade crossings are classified as Category A. SEA found the predicted increases at other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Stanley County is 0.166. This represents a predicted increase of 1 accident every 6 years in the County.

100 MNT

SEA's safety analysis showed that for the 10 public highway/rail grade crossings studied in Stanley County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.008 to 0.042. This translates into a range of increase from 1 accident every 124 years to 1 accident every 24 years, respectively. SEA determined that the predicted increases resulting from the proposed increases in rail traffic would be significant at the 7th Ave. (FRA ID

No. 189858U, MP 484.10), Main Ave. (FRA ID No. 189861C, MP 484.60), and Second Ave. crossings (FRA ID No. 189860V, MP 484.50). These highway/rail grade crossings are classified as Category A. SEA found the predicted increases at other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Stanley County is 0.024. This represents a predicted increase of 1 accident every 42 years in the County.

Jones County

20 MNT

SEA's safety analysis showed that for the 3 public highway/rail grade crossings studied in Jones County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.003 to 0.005. This translates into a range of increase from 1 accident every 292 years to 1 accident every 186 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Jones County is 0.013. This represents a predicted increase of 1 accident every 78 years in the County.

50 MNT

SEA's safety analysis showed that for the 3 public highway/rail grade crossings studied in Jones County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.006 to 0.010. This translates into a range of increase from 1 accident every 162 years to 1 accident every 104 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Jones County is 0.023. This represents a predicted increase of 1 accident every 44 years in the County.

100 MNT

SEA's safety analysis showed that for the 3 public highway/rail grade crossings studied in Jones County, the predicted increases in accident frequency at the 100 MNT level of operation

would range from 0.009 to 0.014. This translates into a range of increase from 1 accident every 106 years to 1 accident every 69 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Jones County is 0.035. This represents a predicted increase of 1 accident every 29 years in the County.

Haakon County

20 MNT

SEA's safety analysis showed that for the 7 public highway/rail grade crossings studied in Haakon County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.002 to 0.015. This translates into a range of increase from 1 accident every 619 years to 1 accident every 68 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Haakon County is 0.054. This represents a predicted increase of 1 accident every 19 years in the County.

50 MNT

SEA's safety analysis showed that for the 7 public highway/rail grade crossings studied in Haakon County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.009 to 0.022. This translates into a range of increase from 1 accident every 108 years to 1 accident every 45 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Haakon County is 0.105. This represents a predicted increase of 1 accident every 10 years in the County.

100 MNT

SEA's safety analysis showed that for the 7 public highway/rail grade crossings studied in Haakon County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.007 to 0.030. This translates into a range of increase from 1 accident every

151 years to 1 accident every 34 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Haakon County is 0.125. This represents a predicted increase of 1 accident every 8 years in the County.

Jackson County

20 MNT

SEA's safety analysis showed that for the 6 public highway/rail grade crossings studied in Jackson County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.004 to 0.021. This translates into a range of increase from 1 accident every 245 years to 1 accident every 48 years, respectively. SEA determined that the predicted increases resulting from the proposed increase in rail traffic would be significant at crossing Highway 14 (190026Y, MP 571.80). This highway/rail grade crossing is classified as Category A. SEA found the predicted increases at other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Jackson County is 0.048. This represents a predicted increase of 1 accident every 21 years in the County.

50 MNT

SEA's safety analysis showed that for the 6 public highway/rail grade crossings studied in Jackson County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.007 to 0.032. This translates into a range of increase from 1 accident every 152 years to 1 accident every 31 years, respectively. SEA determined that the predicted increases resulting from the proposed increases in rail traffic would be significant at crossing Highway 14 (190026Y, MP 571.80). This highway/rail grade crossing is classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Jackson County is 0.076. This represents a predicted increase of 1 accident every 13 years in the County.

100 MNT

SEA's safety analysis showed that for the 6 public highway/rail grade crossings studied in Jackson County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.010 to 0.044. This translates into a range of increase from 1 accident every 105 years to 1 accident every 23 years, respectively. SEA determined that the predicted increases resulting from the proposed construction were significant at crossing Highway 14 (FRA ID No. 190026Y, MP 571.80). This highway/rail grade crossing is classified as Category A. SEA found the predicted increases at the other locations to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Jackson County is 0.107. This represents a predicted increase of 1 accident every 9 years in the County.

Pennington County

20 MNT

SEA's safety analysis showed that for the 3 public highway/rail grade crossings along DM&E's existing rail line east of Wall in Pennington County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.003 to 0.013. This translates into a range of increase from 1 accident every 313 years to 1 accident every 76 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Pennington County is 0.025. This represents a predicted increase of 1 accident every 41 years in the County.

50 MNT

SEA's safety analysis showed that for the 3 public highway/rail grade crossings along DM&E's existing rail line west of Wall in Pennington County, the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.005 to 0.020. This translates into a range of increase from 1 accident every 193 years to 1 accident every 49 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstruction grade crossings. The system-wide change in accident frequency in Pennington County is 0.039. This represents a predicted increase of 1 accident every 26 years in the County.

100 MNT

SEA's safety analysis showed that for the 3 public highway/rail grade crossings along DM&E's existing rail line west of Wall in Pennington County, the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.008 to 0.028. This translates into a range of increase from 1 accident every 132 years to 1 accident every 36 years, respectively. SEA found these predicted increases to be below the criteria for significance.

An increase in the accident frequency would be observed for several of the reconstructed grade crossings. The system-wide change in accident frequency in Pennington County is 0.054. This represents a predicted increase of 1 accident every 18 years in the County.

In summary, SEA determined that the proposed increased rail traffic would significantly increase the predicted accident risk in South Dakota at 14 public highway/rail grade crossings under the 20 MNT level of operation, 28 public highway/rail grade crossings under the 50 MNT level of operation, and 44 public highway/rail grade crossings under the 100 MNT level of operation. Many of these crossings would have significant increases in accident risk at all levels of rail operation. Additionally, many of these crossings are used by school buses numerous times each day.

Evaluation of grade crossings involves the potential for train/vehicle interactions. However, grade crossing safety impacts could also occur to pedestrians. Increased rail traffic would increase the likelihood of pedestrians encountering a train when attempting to cross the rail line. Because grade crossing warning and protection devices are designed for vehicles, they are not totally effective at preventing pedestrians from crossing rail lines. Initially, the increased frequency and speed of trains would be unfamiliar to pedestrians used to present train numbers and speeds. This could lead to potentially dangerous situations if they attempt to cross the tracks. At designated grade crossings or in the vicinity of them, horn soundings should provide warning to pedestrians, reducing the potential hazard.

It is likely pedestrians currently cross the rail line at various points that are not established grade crossings and where no crossing protection would be in place. Trains would not typically sound warning horns at these locations. Pedestrians engaging in this type of crossing would also be unfamiliar initially with the new train frequencies and speed. Their presence in unauthorized areas could place them at risk of injury, as well as risk to the locomotive and its crew should it be required to make an emergency stop. Changes in the behavior of these individuals would be necessary to reduce the risk of potentially significant impacts.

Reconstruction of the existing DM&E rail line has the potential to have a dramatic impact on rail safety. DM&E currently has among the worst safety record in the rail industry as discussed in Chapter 1, with accident rates in 1995 and 1996 of 41.4 and 36 accidents per million rail miles (Tables 1-1 to 1-3). These rates are over 10 times the rate for Class 1 railroads during those same years. Following reconstruction, DM&E railroad would be expected to attain a level of safety comparable to other Class 1 railroads. DM&E's current average of 2-3 major and over a dozen lesser derailments per month would be reduced. Substantially improved safety, resulting in fewer derailments, less damage to cars, locomotives, rail track and bed, property, and reduced loss of shippers materials, would be expected.

Missouri River Bridge Impacts

Reconstruction of the existing bridge across the Missouri River or construction of a new bridge could cause safety concerns to boaters and pedestrians in the immediate area due to the potential risk of falling debris or reconstruction materials. Improvements in bridge construction would provide safer transport of goods across the Missouri River, with a reduced risk of derailment or accidents. Construction of a new bridge would allow for the reduction of curvature in the approach curves for the bridge which would enable an increase of train speeds. Following bridge construction, if the existing bridge is left in place due to being converted to another use, such as a bicycle/pedestrian bridge, boaters would be required to negotiate two bridges in close proximity. The presence of additional in-stream piers would increase the obstacles in the river, potentially increasing the potential for a boating accident. If removal of the existing bridge is required after completion of construction of a new bridge, the potential risks would be similar to those for construction.

4.3.13 HAZARDOUS MATERIALS

Transportation of Hazardous Materials

Neither construction or operation of the proposed project would result in an increase in the types or amounts of hazardous materials currently transported by DM&E. However, following completion of the proposed reconstruction of the existing rail line, the benefits of increased rail safety would reduce the likelihood of an accident involving release of hazardous materials or contaminants. While the likelihood of such an incident is currently low due to the minimal quantities of such materials transported, this risk would be further reduced from an improved rail line.

Hazardous Materials Sites

SEA identified potential impacts to hazardous waste sites from reconstruction activities. Hazardous waste sites are places where releases of hazardous materials have been reported to local, state, or Federal authorities. Related environmental concerns include facilities licensed to treat, store, or dispose of hazardous materials, leaking underground storage tanks (LUSTs), and solid waste facilities and landfills (SWFs/LFs). During construction, earthmoving activities could expose contaminants to construction workers, nearby residents, and railway workers. Wildlife, vegetation, surface water, and groundwater may also be exposed to contamination during construction. Because specific site information for each identified site is not available, it is not possible to determine the potential impacts of construction on these sites. DM&E should coordinate with the EPA and the South Dakota Department of Environment and Natural Resources to obtain specific information on the extent of contamination in its existing right-of-way, whether reconstruction activities have the potential to impact the site, and any protective actions necessary to avoid disturbance to these sites during construction.

During project operation, no impacts should occur to existing hazardous material sites. There is the potential during railroad operations that a spill may occur during a derailment. However, this is very unlikely due to the expected reduction in derailments and the regulations regarding handling, storage, and disposal of hazardous materials.

4.3.14 ENERGY RESOURCES

Transportation of Energy Resources

The proposed project has the potential to significantly impact the transportation of energy resources. Upgrading of the existing DM&E rail line would result from DM&E successfully constructing a rail line extension into the PRB and obtaining contracts to transport coal from the basin to utilities throughout the upper Midwest. As discussed in Chapter 1, this would provide a more cost-effective transportation route for PRB coal. It would help alleviate service and congestion problems at the mines and within the PRB, making transportation of PRB coal for each of the rail carriers serving the basin more efficient and reliable. Energy provided by PRB coal would be available to the user at a more economical rate, higher reliability, and greater efficiency.

Utilization of Energy Resources

For many of the same reasons as discussed in the previous Section, the proposed project has the potential to significantly impact the utilization of energy resources. The shorter routes provided by the project would reduce the transportation costs for PRB coal, increasing the

attractiveness for utilities to switch to this coal or increase their use of it. Use of PRB coal is expected to increase in the future, as shown in Table 1-5. The increased rail capacity provided by this project would allow the mines to meet production projections and reliably deliver the larger quantities of coal to users.

The shorter route provided by the proposed project would result in significant fuel savings. Based on mileages to specific power plants discussed in Chapter 2, the DM&E route could provide mileage savings of several hundred miles over the routes of other rail carriers. This would result in a potential savings of hundreds of thousands of gallons of diesel fuel annually, providing a much wiser use of this resource.

Improved utilization of energy resources could also occur at the mines. Mines would not be able to expand their present operations beyond the current permitted level. However, as discussed in Chapter 1, many of these mines do not currently meet these production levels, in part due to inadequate rail service. Operation of the proposed project may enable these mines to meet permitted production levels and supply larger quantities to utilities. PRB coal is more economical to mine than eastern coal due to the relatively shallow overlying layers of soil and the thickness of the coal seams. This results in lower quantities of energy, such as diesel fuel and electricity, required to operate mining equipment necessary to extract, store, and load the coal. Increased utilization of PRB coal would also make more efficient use of that energy necessary to provide coal to the users.

Recyclable Commodities

Rebuilding of the existing DM&E rail line would require removal of hundreds of miles of rail, railroad ties, bridge materials, and tons of ballast and other rail bed material. Due to its age, most of the rail would likely be unsuitable for reuse and would be sold for scrap. Ties and wooden bridge materials could be sold for landscaping or other uses; although most would be in such poor shape they would be unmarketable. DM&E could potentially sell or give the ties to electrical utilities currently using ties as a fuel source for electric generation. However, large quantities may require disposal in landfills. Steel bridge materials which could not be used to upgrade bridges would be sold for scrap. Stone materials in some bridges and culverts may be used in railroad landscaping or sold for that purpose. Unmarketable materials could be used for aggregate, or placed in a landfill. Ballast and other rail bed material no longer suitable for rail operations could be used as fill material or aggregate for other projects such as roadways.

Reconstruction of the existing rail line would not only generate large volumes of recyclable materials, but would also generate a potential market for them. Rail and ties generated by other rail carrier's construction projects could generate suitable materials for use by DM&E.

Although these materials would likely be unsuitable for the rail line, they may be usable as part of yard and industrial sidings, spur rail lines to serve existing shippers, and provide temporary materials for construction. During operation, these materials would be replaced as new materials became available.

DM&E currently transports only limited amounts of recyclable commodities. These include less than 100 carloads annually of scrap steel. Operation of the reconstructed rail line would provide an improved rail line over which to transport these commodities.

4.3.15 CULTURAL RESOURCES

Impacts to cultural resources would occur if important archaeological or historic sites or structures which could substantially add to the scientific understanding of human occupation of the project area are damaged or destroyed during rail line reconstruction. Encountering and affecting cultural resource sites would be most likely in those areas where rail bed work would require earthmoving or excavation activities. However, confining reconstruction activities to the existing rail line right-of-way would minimize the area of disturbance, reducing the likelihood of encountering cultural resources. Much of the land within the existing rail line right-of-way was disturbed during rail line construction and any archaeological resources it contained were damaged or destroyed. However, SEA's investigation of recorded cultural resources sites within the existing right-of-way determined undisturbed areas are present within the right-of-way. These areas would be most likely to contain undisturbed cultural resources. If earthmoving activities to repair the existing rail bed or construct sidings are required in these areas, cultural resources would be at risk damage.

The project area has a rich and long history of human occupation and known sites of archaeological significance, including sites of significant importance to Native Americans, occur throughout the project area and along the existing rail line. Archaeological sites could be revealed during reconstruction and excavation for any of the alternatives and would offer the opportunity to recover the artifacts they contain. However, should unknown grave sites be encountered, and some are known to occur within the existing right-of-way, the artifacts and remains they contain could be damaged or destroyed. Any type of disturbance to prehistoric graves would be considered a significant adverse impact by Native American Tribes. Damage or destruction of significant archaeological or historic sites would be considered by SEA to be a significant impact, as would any disturbance to grave sites.

Eleven archaeological sites are known within or immediately adjacent to the existing DM&E rail line right-of-way in South Dakota. Five of these sites are considered eligible for listing on the National Register of Historic Places (NRHP) (Table 4.1-26). Of the eligible sites,

four of the sites are prehistoric and 1 is historic. The historic site is outside the right-of-way and will not be affected by the project unless additional right-of-way is required. All of the prehistoric sites could be adversely affected by the project if the rail bed would require replacement, or if the construction methods would impact areas outside the existing rail bed. It is expected that some of the archaeological sites may be eligible for the NRHP as TCP's.[15] Any actions taken concerning these sites would be in accordance with the Memorandum of Agreement (MOA) [16] and Programmatic Agreement (PA).[17]

There are 239 bridges and culverts (including 64 iron and steel bridges and stone box culverts, 148 open deck timber pile spans, and one cast concrete slab) along the existing rail line. Bridge No. 1500, the existing bridge over the Missouri River, is listed on the NRHP. This bridge is discussed further below. Additionally, there are seven buildings that were identified (two are listed in the NRHP). There are 191 bridges that are recommended eligible for the NRHP. The portion of the DM&E rail line from Winona, Minnesota to Wasta, South Dakota could be eligible for NRHP listing as a linear historic district.

Replacement or extensive modification of NRHP eligible bridges and culverts would result in an adverse impact to historic resources. Removal or modification of historic structures could also result in an adverse impact. Reconstruction of the existing rail line could result in it no longer being eligible as a linear historic district. Because of the number of potentially eligible structures and the potential of the project to be a linear historic district, the impacts to historic resources from reconstruction of the existing rail line could be significant on cultural resources.

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[15] A Traditional Cultural Property can be defined generally as 1 that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in the community's history, and (b) are important in maintaining the continuing cultural identity of the community. Examples include: 1) a location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world; 2) a location where Native American religious practitioners have historically gone, and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural roles or practice; 3) a location where a community has traditionally carried out economic, artistic, or other cultural practices important in maintaining its historic identity (includes collection of medicinal plants).

[16] A Memorandum of Agreement means the document that records the terms and conditions agreed upon. In this case the Memorandum of Agreement is between the Federal agencies, the DM&E railroad, and the participating Tribes and tribal organizations. It is designated to address concerns that may be presented by construction of the Powder River Basin Extension Project.

[17] A Programmatic Agreement means a document that records the terms and conditions agreed upon to resolve the potential adverse effects of a Federal agency program, complex undertaking, or other situation.

During operation of the project, impacts to cultural and historic resources would primarily relate to increases in rail traffic along the existing rail line. However, rail traffic increases would have no impact on archaeological resources. Historic resources identified along the rail line were all developed as part of or in association with railroad activities. The operation of the project would not change the nature or context within which these structures are found. No impacts to historic or cultural resources are anticipated during operation of the rail line.

Missouri River Bridge Impacts

The existing railroad bridge spanning the Missouri River between Pierre and Ft. Pierre, South Dakota is listed on the NRHP. The bridge was constructed in 1906 with modifications made in 1927. Presently, it cannot be determined whether rehabilitation of the bridge would alter its status on the NRHP. If the nature and character of the existing bridge are retained, rehabilitation would not likely affect the historic status of the bridge. However, extensive modifications could make the existing bridge no longer eligible for listing.

Construction of a new bridge would not itself affect the historic status of the existing bridge, provided ownership of the existing bridge can be transferred and the bridge retained without major modifications. However, if ownership cannot be transferred, removal of the bridge would be required. Extensive modifications, loss of NRHP status, or removal would be considered a significant impact.

4.3.16 SOCIOECONOMIC

The following discusses those affects related to reconstruction of the existing rail line, as well as from the increased level of operation of the rail line upon various social and economic criteria. Socioeconomic impacts related to construction and operation of rail yards along the existing rail line in South Dakota are discussed in Section 4.10.

4.3.16.1 Population and Demographics

Short-term increases in population in all counties through which the existing rail line passes could be expected during reconstruction. While many of these would likely be filled by local workers, many workers specialized in rail reconstruction would likely relocate to the area. These workers would likely not locate permanently in the area, rather they would move to the area of the next project following completion of their work on this project. During reconstruction, non-local workers would likely locate in communities containing facilities such as lodging, groceries, and restaurants that are close to portions of the existing rail line they are involved in reconstructing. Non-local workers could also be expected to relocate during the reconstruction period to remain near the work area. This would be necessary to minimize travel

times from lodging to work sites as DM&E has indicated reconstruction would proceed at approximately 1.0 mile per day. U.S. Highway 14 and I-90, both generally parallel the existing rail line, would provide easy access to the project area from points along the rail line, allowing local workers to retain their current residences and commute to the project site. Table 4.3-23 provides an estimate of the direct reconstruction jobs potentially requiring workers to relocate to the area.

Additionally, indirect jobs, both temporary and permanent, in the service areas (restaurants, convenience stores, bars, grocery stores, etc.) would likely increase throughout the area as the demand for these services increased with the influx of additional workers (Table 4.3-24). These jobs would also likely be filled locally. However, the amount of reconstruction activity and demand for other types of jobs may entice some individuals to relocate to the area seeking employment. This number would be small and likely occur in the larger communities along the rail line, such as Brookings, Huron, Pierre, and possibly Rapid City.

The counties in which the larger communities are located have varied population changes (Tables 4.1-27 and 4.3-24). Brookings County (Brookings) has seen an increase in population of over 7 percent, much more than the less than one percent increase anticipated as a result of this project. Beadle County (Huron) experienced a population decrease of 1.1 percent. The potential population increase of 4.5 percent would offset this loss and result in a population increase of approximately 3.4 percent.

Hughes County (Pierre) and adjacent Stanley County experienced a 4.4 percent increase and slightly less than 1.0 percent decrease in population, respectively. These compare to anticipated population growths of less than one percent for Hughes County and nearly eight percent (7.8 percent) for Stanley County. Hughes County should be able to easily accommodate the anticipated growth. However, Stanley County would experience a substantial percentage increase that could impact the county and its communities' ability to provide adequate services. In actuality, much of the anticipated growth in Stanley County would likely occur in Hughes County as Pierre is the only community of significant size in the region. Its larger size should help absorb the regional increase in population.

Of all of the counties anticipated to have a potential population increase of greater than two percent (Beadle, Hyde, Stanley, Jones, and Haakon), all but Stanley have experienced population declines greater than the anticipated increases. These counties should be able to absorb the temporary increase in population. Stanley County has experienced a minimal population decline but could experience a large increase as noted above. However, because facilities and services are limited or not available in the county due to its rural nature, portions of this increase could be expected to locate in adjacent counties, particularly Hughes. This diffusion

of population would help reduce the strain on Stanley County. Additionally, since all the increase is anticipated for reconstruction, once reconstruction in and adjacent to Stanley County has been completed, reconstruction personnel would leave the county, returning the population to near pre-reconstruction levels. No significant permanent increase to the county population is anticipated. Therefore, none of the South Dakota counties should experience negative impacts due to increases in population during reconstruction. Table 4.3-24 provides a summary of the potential direct and indirect construction and permanent jobs associated with rail line reconstruction in South Dakota.

Table 4.3-24
Employment Compared to Population Statistics for Potentially Affected Counties - South Dakota

County	Reconstruction Employment		Permanent Employment (startup/full operation)[1]	Percent of County Population/County unemployed (1994)	Change in County Population (1986-1994)
	Direct	Indirect			
Brookings	62	30	50/116[2]	<1/2.7	7.20
Kingsbury	54	24	*	1.4/3.8	- 8.50
Beadle	158	69	250-300/600	4.5/2.6	- 1.10
Hand	46	21	*	1.6/2.4	- 10.40
Hyde	26	11	*	2.2/2.7	- 12.60
Hughes	86	38	*	<1/2.2	4.40
Stanley	144	64	*	7.8/3.2	- 0.90
Jones	32	14	*	3.5/3.2	- 12.80
Haakon	91	40	*	5.2/3.2	- 9.70
Jackson	23	10	*	1.1/5.1	15.10

* No permanent railroad related jobs are anticipated. However, indirect service jobs are likely to develop.

(1) Includes direct railroad jobs only.

(2) Assumes DM&E would keep its corporate headquarters in Brooking, South Dakota.

4.3.16.2 Employment and Income

Reconstruction is anticipated to take two to three years and would occur simultaneously in three states. Therefore, separate construction work forces would be required in each state. Approximately 1,246 direct construction-related jobs are anticipated in South Dakota, with a two-year duration (Table 4.3-24). These jobs would be spread throughout the State, with the total number of workers divided into numerous smaller crews responsible for a particular aspect of construction, such as rail bed preparation or rail placement, or completion of a particular geographic area of the project.

Construction jobs would require a wide range of workers and activities. More generalized jobs such as heavy equipment operators, carpenters, electricians, landscapers, truck drivers, and mechanics would likely be filled by local workers, contractors, and farmers during times between planting and harvest and during the winter. However, because of the number of workers required and the limited availability of workers in many less populated areas of the state, non-local workers may also be required to fill these positions. Additionally, many unskilled laborer or apprentice positions would also be available. More specialized workers, such as rail construction contractors, would likely be non-local. Such contractors in-state could be utilized. However, as these workers tend to be specialized in what they do and relocate from job to job, these positions would likely be filled by non-local and out-of-state workers.

In addition to direct reconstruction jobs, approximately 591 indirect jobs are anticipated to be generated by the proposed project (Table 4.3-24). These jobs would occur over the two-year reconstruction period and would likely continue for two to three years after reconstruction is completed. These jobs would result from the presence of workers, both local and non-local, that would be present during reconstruction. Local workers would have consistent income resulting in more money to spend locally on goods and services. They would continue to spend following completion of reconstruction, thus resulting in the two to three year post-reconstruction requirement for jobs. Non-local workers would spend portions of their income locally, increasing the demand for goods and services. Additionally, non-local workers would require lodging, using local hotels, motels, rental properties, and trailer and RV parks. All these economic sectors would be expected to increase in demand and value. Shortages, particularly during the summer tourist months, could occur, potentially resulting in increases in construction of hotels and other lodging facilities. Local residents may be able to rent rooms or entire homes to construction workers, supplementing their incomes. Goods and services, such as those provided by restaurants, convenience stores, gas stations, movie theaters, bars, bowling alleys, and grocery stores, would increase in demand due to the increased population from construction workers. New businesses such as these could be expected, resulting in additional construction activity, providing jobs for construction workers as well as to staff the new business. Table 4.3-25

provides estimates of construction related earning in the project counties. A portion of these earnings would be available to purchase goods and services from local business and provide tax revenues for the State and County.

Table 4.3-25
South Dakota Railroad Construction Earnings by County

County	Estimated Earnings ($)
Brookings	9,246,300
Kingsbury	7,434,200
Beadle	21,777,900
Hand	6,385,300
Hyde	3,494,800
Hughes	12,421,300
Stanley	19,922,700
Jones	4,321,300
Haakon	12,588,900
Jackson	3,112,400
Total	**91,458,800**

The population in the project area counties is over 80,000, with an average unemployment rate of 3.3 percent (Tables 4.1-28 to 4.1-30). At this rate, approximately 6,000 persons are unemployed, well over the number of local workers anticipated to be required during project construction. Although these persons may not have the skills for rail reconstruction, they would likely have some skill that could be used for employment in one or more of the many jobs created during reconstruction, including non-skilled laborer and apprentice positions, and jobs in service industries.

Workers in laborer and apprentice positions would have the opportunity to learn a skill or trade and obtain permanent employment in that field following completion of rail reconstruction. More skilled workers in many areas could be expected to seek employment at positions created by rail line reconstruction as higher wages would likely be paid for these jobs. This would create positions for less skilled employees as well as opportunities for persons seeking to learn new jobs.

Unemployment throughout the project area could be expected to decline. However, the demand for labor could result in competition for workers and thus higher wages and better benefits to attract qualified employees. This seems likely, due to the low unemployment within the region.

Additionally, easy access throughout the project area is provided by U.S. Highway 14 and I-90. Persons throughout the area could be expected to travel some distance for opportunities at higher wages for jobs related to rail line reconstruction. Additionally, the attractiveness of many good paying jobs in the area may result in non-local workers or those unemployed relocating in the area in order to seek employment.

While unemployment within the project area counties is relatively low, averaging approximately 3.3 percent, in several adjacent counties it is much higher, particularly where all or much of the county is within the boundary of a Native American Reservation. These counties include Dewey and Ziebach (Cheyenne River Reservation), Shannon and Jackson (Pine Ridge Reservation), Todd (Rosebud Reservation), and Buffalo (Crow Creek Reservation). Table 4.3-26 summarizes the unemployment statistics for these counties. Unemployment rates for Lyman, Hughes, and Hyde counties are also included as these counties also contain reservation land associated with the Lower Brule and Crow Creek Reservations. High unemployment in these counties reflects a high unemployment rate among Native Americans living on Reservations. While the Rosebud and Cheyenne River Reservations are not in close proximity to the reconstruction area, the Reservations provide a potential labor force within a reasonable distance, particularly if DM&E elects to use mancamps in the western areas of South Dakota. During operation, high paying permanent jobs near Huron and Wall would likely be close to several reservations such that residents unwilling to relocate off the reservation may be willing to commute the distance to work. This project would then provide needed employment opportunities to these areas and allow DM&E to utilize a larger percentage of local labor.

Table 4.3-26
Unemployment Statistics for Counties containing Reservations near the Project Area

County	Percent Unemployed (1997)
Buffalo	13.2
Dewey	12.1
Hughes	2.6
Hyde	3.4

Table 4.3-26
Unemployment Statistics for Counties containing Reservations near the Project Area

County	Percent Unemployed (1997)
Jackson	5.5
Lyman	5.4
Shannon	12.0
Todd	8.8
Ziebach	10.1
Average	**8.1**

*Based on 1994 data.

DM&E would likely acquire a variety of construction materials and supplies within the immediate and adjacent project area. These could include concrete, steel, ties, rail, ballast rock, fill, subgrade and subballast material, fencing, lumber, and a variety of other materials. It would be preferable to acquire these locally due to increased costs associated with importing materials. While it is likely many materials would not be available locally, many local businesses would be able to provide what materials they could. These would include commercial gravel, rock, and sand quarry operations, hardware stores, lumber yards, ready mix plants, and other construction related material dealers. Providers of these materials could expect increases in sales during the construction period.

Potential project impacts to employment and income are expected to be beneficial and potentially significant, particularly during reconstruction. Employment opportunities are expected to increase and unemployment decrease throughout the area. Lower unemployment would increase the demand for workers, potentially resulting in higher wages and better benefits being offered to attract qualified persons. Following reconstruction, additional high-paying railroad jobs would continue to benefit the labor market by providing high-paying jobs within the area.

4.3.16.3 Public Services and Fiscal Condition

Counties are able to fund a variety of services by collecting property and other taxes. As part of the proposed project, all the area counties should receive additional tax revenues. These revenues would result from new railroad facilities being constructed, existing facilities upgraded, and increased spending by construction workers and additional permanently employed individuals within the county. Table 4.3-27 provides an estimate of the sales and use taxes generated in each county during project construction due to purchases of materials for construction and spending by construction workers for goods and services. A portion of these taxes would be available to the county.

Table 4.3-27
Sales and Use Taxes Generated by County - South Dakota

County	Taxes ($)
Brookings	1,072,800
Kingsbury	975,000
Beadle	2,142,700
Hand	826,200
Hyde	464,200
Hughes	1,436,500
Stanley	1,934,800
Jones	512,900
Haakon	1,416,900
Jackson	388,500
Total	11,170,500

Additionally, DM&E would pay property taxes on its facilities. These taxes would vary between counties, depending on the actual facilities located in the county and the county's tax assessment rates. Table 4.3-28 provides an estimate of the property taxes DM&E would pay each

year under the 40MNT and 100 MNT operating scenarios.[18] These amounts are compared to the taxes DM&E paid in 1997 and the total taxes collected by the counties in 1997 (Table 4.1-31 also provides information on total taxes collected in 1998. However, for consistent comparison, those amounts are not included here).

Table 4.3-28
Comparison of Property Taxes Paid and Anticipated for the Proposed Project

County	DM&E 1997 Taxes Paid ($)	Taxes assesse at 40 MNT ($)	Taxes assessed at 100 MNT ($)	Total Taxes Collected 1997 ($)
Brookings	2,136	1,125,600	1,369,500	17,667,412
Kingsbury	1,615	1,113,200	1,354,500	1,064,307
Beadle	6,760	1,251,600	1,522,900	14,199,907
Hand	1,147	943,900	1,148,600	4,173,086
Hyde	908	562,500	684,400	1,881,410
Hughes	2,372	1,284,400	1,562,900	11,841,751
Stanley	0	343,400	417,900	2,764,032
Jones	234	429,900	523,100	1,422,769
Haakon	914	1,041,000	1,266,700	2,317,204
Jackson	0	343,400	417,900	1,577,426
Total	**16,086**	**8,438,900**	**10,268,400**	**58,909,304**

[18] The 40 MNT and 100 MNT levels are both included as the increase in operations would require construction of additional facilities that would increase the value of DM&E property within each county. Because the level of operation would be subject to the market, both of these levels are presented for comparison. The 20 MNT level of operation was not presented in the economic report prepared for the project and is not presented. This level of traffic would occur at project startup and is anticipated to only occur for a short time before operating levels increase. Therefore, 40 MNT and 100 MNT likely are a more accurate reflection of the potential long term tax impacts.

Property taxes under the proposed project would increase substantially over those currently assessed for DM&E. This additional revenue would contribute significant additional funds to each of the counties. These funds would enable the counties to continue to provide their current services, possibly enabling them to upgrade or increase what they are able to provide due to this increase in revenue being accompanied by little permanent increase in population or change in county responsibility. Any increase in county population due to the project should easily be accommodated by the increased revenues generated by the project.

Overall, the project should have a beneficial impact on the services offered by the counties and the counties' fiscal conditions. Increased tax revenues should easily offset any additional financial burden the project may cause the counties while still providing additional revenues for county services.

4.3.17 ENVIRONMENTAL JUSTICE

Nine census block groups in South Dakota along the existing DM&E rail line were determined by SEA to meet the criteria for classification as environmental justice.[19] These census block groups include one each in Brookings, Beadle, Hyde and Jones Counties, and five in Hughes County. The census block groups in Brookings and Hyde Counties occurred outside any established community. All of the census block groups in Hughes County are within the town of Pierre, Huron for the single census block group in Beadle County, and Capa for the census block group in Jones County. All but one census block group, located in Hughes County, were classified as environmental justice due to having a percentage of persons in the census block group at or below the poverty level that was 10 percent or more than the percentage for the county in which the census block group was located. The one remaining census block group in Hughes County was classified as environmental justice due to over 50 percent of the population of the census block group being considered low income. In addition, one census block group in Hughes County meeting the 10 percent criteria for low income also had a percentage of minority that was more than 10 percent higher than the overall percentage of minority in Hughes County.

SEA evaluated the impacts of the proposed increases in rail traffic to these environmental justice census block groups and compared these impacts to the impacts expected to non-environmental justice census block groups. SEA's analysis determined that the census block groups in Brookings and Beadle Counties would experience disproportionate impacts due to increased noise. Disproportionate impacts would occur at all levels of operation (20 MNT, 50

[19] Nine additional census block groups in Brookings County were identified by SEA as meeting the criteria for classification as environmental justice communities. These census block groups are all located within the town of Brookings and are discussed as part of the evaluation of the proposed Brookings Alternatives in Section 4.9.

MNT, and 100 MNT) for the Beadle County census block group and at the 50 MNT and 100 MNT levels for the Brookings census block group.

In addition, SEA determined one census block group in Hughes County would be disproportionately impacted for grade crossing safety due to a grade crossing (Harrison Street, FRA ID No. 189844L, MP 480.5) within the census block being determined to experience an increase in accident frequency meeting SEA's criteria for significant impact. These impacts would occur at the 20 MNT, 50 MNT, and 100 MNT levels of rail traffic. Also, SEA determined one census block group in Brookings County would be disproportionately impacted for grade crossing safety due to a grade crossing (459th Street/Co. Rd. 1, FRA ID No. 197448R, MP 302.8) within the census block being determined to experience an increase accident frequency meeting SEA's criteria for significant impact. These impacts would occur at the 50 MNT and 100 MNT levels of rail traffic.

SEA also analyzed census block groups to determine if any environmental census block groups would be disproportionately impacted by the proposed rail line reconstruction and increased levels of operation due to being adversely impacted by more than one evaluation criteria (noise, safety, air, transportation, etc). SEA's analysis did not identify any environmental justice census block groups that would be adversely impacted by more than one evaluation criteria. Therefore, no disproportionate impacts would be borne by environmental justice communities due to being adversely affected by multiple impact categories.

4.3.18 RECREATION

A wide variety of recreational opportunities are available within the project area, as discussed in Section 4.1.15.1. Although a wide variety of opportunities are available, these opportunities are only capable of accommodating small numbers of people at any given time due to their size or limited available facilities. Many of the recreational opportunities common to the project area are outdoor oriented such as hunting, fishing, camping, snowmobiling, biking, and hiking.

During reconstruction of the existing rail line, outdoor recreation activities immediately adjacent to the rail line could be negatively impacted by reconstruction noise, human activity, fugitive dust, and increased vehicle traffic. These impacts would likely detract from the overall solitude of the area, reducing the enjoyment of the recreational experience. During off-days, reconstruction workers may take advantage of nearby opportunities, leading to increased use and possibly crowding. Regular users and tourists may experience frustration at larger than normal crowds and reconstruction related disturbance. Recreational activities subject to such disturbance would likely experience a decline during the period of reconstruction.

When occurring in close proximity to the existing DM&E rail line, outdoor recreational activities such as hunting, fishing, hiking, camping, and bike riding could be impacted by increased noise from the additional rail traffic projected to occur under operation of the rail line. Noise increases could detract from the overall solitude of the area and reduce the enjoyment of the recreational experience. Noise may disturb game immediately adjacent to the rail line, potentially reducing its availability to hunters. Impacts to fishing may include noise disturbance, increased roadway congestion, and water quality degradation during reconstruction. However, if hunting and fishing success in areas close to the rail line is good, some participants would be expected to return to these locations.

Impacts to hikers and bikers using parks and trails would include noise disturbance, reduced safety where crossings of the rail line would be required, and potential road congestion to access these areas. Impacts to trail users would occur primarily at and in close proximity to locations where trails cross the rail line. Snowmobilers should experience little impact with the exception of potentially reduced safety when crossing the rail line. Noise from snowmobiles would shield the user from train noise. Therefore, train noise would have no impact on the recreational experience of snowmobilers.

At established recreational areas and state parks, operation of the railroad could increase park noise levels. Park users would avoid parts of the park impacted by noise, seeking solitude in more distant areas of the parks. This could result in crowding and competition for these areas. Traffic delays on roads may also detract from the recreational experience. Safety issues may arise from the presence of unit coal trains operating in close proximity to public use areas at high speeds and across access roads. Campers would likely experience disturbance from night train operations, interrupting sleep and the camping experience. This could reduce revenues at parks and in the local communities dependent on recreational dollars.

DM&E indicated in its Application to the Board that it intends to develop a tourism passenger excursion train. This service would be designed to provide tourism and recreational opportunities along the rail line by providing interested persons, particularly "railroad buffs," the opportunity to take a ride on a train. DM&E does not have specific plans in mind but has indicted considering such things as dinner trips, wildlife viewing trips, and transport to the Black Hills region from communities at the eastern end of its system. No regular service, suitable for commuters would be provided. The service would be designed solely to provide a recreational experience for the rider.

Overall, impacts to recreation are expected to be localized and restricted to individuals using opportunities near the rail line. Currently, existing rail operations expose recreation to impacts similar to those expected to increase during operation of the proposed project. Impacts

would be related to an individuals perception of the recreational experience along the rail line. It is expected that during operation of the project, recreation could be significantly impacted for certain individuals. However, abundant recreational opportunities exist throughout the South Dakota project area. This would allow any displaced recreational users the opportunity to utilize other areas and facilities. For the most part, the proposed project would only have minimal impacts to recreation. However, to a small number of individuals, the impacts could be significant.

Missouri River Bridge

The reinforcement option for the existing bridge over the Missouri River would require the reconfiguration of the multi-purpose recreation trail that passes under the bridge along the river. Reinforcement activities would require the trail being moved so that users can safely utilize this segment of the trail. Trail closure during realignment would prevent use of the trail portions near the bridge. Construction related congestion, equipment, activities, and noise would detract from use of the trail for the period of time for bridge reinforcement, lasting two to three years. The trail would be permanently changed to a new trail configuration. Increased train traffic on the bridge would result in increased noise disturbance to trail users during train passing events. It is possible that a number of users would find the increased use of the tracks unacceptable, and would switch to a different trail in the area. Because public land would be affected, reinforcement of the Missouri River bridge would likely require the completion of a Section 4(f) Statement in accordance with the Transportation Act of 1966 which discourages any U.S. Department of Transportation agency, in this case the Coast Guard, from using publicly owned park land unless no feasible alternative is present and all possible planning to minimize harm to the land is included in the action.

The site of the bridge crossing the Missouri River is located in a portion of the river comprising Lake Sharpe. The lake was observed by SEA to be a popular boating area, and the site of the bridge itself popular for fishing. Reinforcement activities to the existing bridge would likely require closure of areas of the lake around the bridge to boating traffic. Fishing or other activities immediately under or around the bridge would be restricted for boater safety. Closures of bank areas would also likely occur, preventing bank fishing under and around the bridge. Following completion of bridge work, restrictions would be lifted and previous activities and patterns of use restored. No impacts would be anticipated to boating or fishing during operation, except that fishermen may be disturbed or distracted during a passing train.

The second option for the Missouri River bridge would be construction of a new bridge immediately upstream of the existing bridge. Recreational impacts from construction of a new bridge would be similar to those expected with reinforcement of the existing bridge. However, as

new bridge construction would require more extensive in-river work and installation of several new piers, more extensive closures or restrictions could be necessary than for bridge reinforcement. Following bridge construction, if the existing bridge is left in place due to being converted to another use, such as a bicycle/pedestrian bridge, boaters would be required to negotiate two bridges in close proximity. The presence of additional in-stream piers would increase the obstacles in the river, potentially increasing the potential for a boating accidents. Additional piers would also provide additional structure for fish and areas for fishing boats to congregate pursuing opportunities for fishing locations. If the existing bridge would not be acquired, Coast Guard regulations would require it be removed so as not to provide any navigation hazard. This would remove the existing piers as potential boating obstacles. Any debris falling into the river during bridge demolition or dismantling would provide fish structure and areas for fishermen to orient.

4.3.19 AESTHETICS

4.3.19.1 Visual Resources

The reconstruction activities would cause construction-related visual impacts. Visual impacts would be restricted to the existing rail line right-of-way and would include ground disturbance, vegetation clearing, and the presence of heavy equipment. Although the rail line does not pass through any designated scenic areas or viewsheds, the flat topography would make disturbance visible for an extended distance. Most impacts to visibility would be observed at grade crossings. In these areas construction would be similar to that of road construction. No significant visual impacts would result from reconstruction of the existing rail line.

Impacts to the scenic nature of the area may result from the installation of new rail structures such as bridges, culverts, rail, ties, and ballast. Clearing of vegetation would make these structures more visible. Until some degree of weathering occurs, dulling the appearance of new materials, they would continue to be visible. However, the existing rail line has been in place for over 100 years, and other rail lines are located in the project area. The reconstructed rail line is not anticipated to significantly differ in appearance from the existing rail line. Therefore, no major impacts to visibility are anticipated due to the operation of the reconstructed rail line.

There are no designated wild or scenic rivers crossed by the existing rail line in South Dakota. None would be impacted by this component of the project.

Missouri River Bridge

Ground disturbance during rehabilitation or construction could disrupt the scenic view along the Missouri River, Lake Sharpe. Impacts associated with construction, such as the presence of large machinery and removal of vegetation would be similar to those presented above. Construction of a new bridge would add another structure across the river, which would change the character of the area. However, if the existing bridge is used for bicycle/pedestrian crossing, the availability of a new vantage point would be provided to those bridge users.

4.3.19.2 Nightlights

In the event that it would become necessary for construction crews to work during the dark hours of the day, the use of artificial lighting during the reconstruction phase of the project would result in light pollution impacts in the area. If near the rail line, reconstruction, security, or other associated lighting could disturb residents trying to sleep. Such lighting may be recognized by local residents as unusual but it is not anticipated to detract from the nature of the night environment as discussed in Section 4.4.20. Minimal impacts from lighting along the rail line would be expected as numerous sources of light currently occur along the existing rail line, any reconstruction lighting would move along the rail line as reconstruction proceeds, and would only occur at scattered locations over the two to three year construction period.

During rail line operation, the lights from passing trains during dark hours may have minor impacts on the people living near the rail line. However, any impacts would be restricted to those residents in close proximity to the rail line. Because train headlights would be directed down the rail line, impacts would be minimal and similar to those presently occurring. Any changes in nightlights resulting from reconstruction and operation would not significantly alter the night environment of the project area.

Missouri River Bridge

The proposed rebuild or new construction of the bridge over the Missouri River would involve placement of new lighting along the bridge. This increased light could cause some disturbance to residences located near the bridge. However, only a few residences are located in the area of the bridge and these are generally several hundred feet from the bridge. Safety lighting on the bridge should not affect these residences, particularly due to the numerous other sources of light in the Pierre/Fort Pierre area.

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4.4 SOUTH DAKOTA / WYOMING - NEW CONSTRUCTION

Approval of the proposed Powder River Basin (PRB) Expansion Project would include the construction of new rail line in South Dakota and Wyoming. The potential construction and operational impacts related to the new DM&E rail line as well as those associated with the No-Action Alternative, are discussed in this Section. They include those impacts anticipated to occur due to new construction in previously undisturbed areas as well as portions of the proposed Extension Alternatives that coincide with or parallel existing rail line. Alternative alignments are proposed for specific portions of the new construction alternatives and are designed to avoid environmentally sensitive areas. Information and descriptions relating to the potential impacts associated with construction and operation of each of these alternatives is presented in Sections 4.5 to 4.8. Alternative routing for Mine Loops is presented in Sections 4.7 and 4.8.

4.4.1 NO-ACTION ALTERNATIVE

The No-Action Alternative would be denial by the Board of granting DM&E authority to construct a rail line extension into the PRB. The No-Action Alternative would result in no construction activities related to extending DM&E's existing rail line into the PRB and no impacts from the presence of an operating rail line. None of the following construction impacts associated with constructing the new rail line would occur:

- disruption to land uses,
- conversion of land to rail related facilities,
- disturbance to and erosion of soil,
- discovery and recovery, or possible damage or destruction of archaeological and paleontological resources,
- clearing of vegetation,
- disturbance to and loss of wildlife and their habitat,
- air emissions from construction vehicles and fugitive dust,
- increases in noise from construction equipment,
- disruption of traffic flow at grade crossings, and
- increased economic activity from construction workers.

The following operational impacts associated with rail transport of coal would not occur:

- increased noise levels, air emissions, and opportunities for vehicle delays at grade crossings, and concerns for train and vehicle safety along the existing rail line,
- improvement of DM&E's safety record due to upgrading its existing rail line,
- service and reliability improvements for existing shippers,

- inconvenience to ranchers and farmers whose lands are on both sides of the rail line,
- disturbance and mortality to wildlife and livestock from passing trains,
- increased noise levels disturbing residents and recreationists,
- increased air emissions from locomotives contributing to regional haze,
- vehicle delays at new or expanded grade crossings,
- potential for train/vehicle and train/pedestrian accidents at grade crossings, and
- additional jobs and tax revenues generated by increased railroad activity and improved railroad facilities

Although the No-Action Alternative would result in no changes to the existing environment, it is likely the No-Action Alternative would result in continued deterioration of DM&E's existing rail system. The present condition of the DM&E system impacts rail service efficiency and reliability, and both rail and vehicle safety, as evidenced by its safety record (Tables 1-1 to 1-3).

The Board, in its December 10, 1998 decision, indicated that absent the funds generated by DM&E's proposal, DM&E could cease to exist as a viable railroad. Because the No-Action Alternative would not result in DM&E accessing coal mines in the PRB, it would not achieve the same revenue gains associated with the build alternative. Moreover, it appears unlikely that another rail carrier would acquire the DM&E system given its deteriorated condition and limited revenue base. Therefore, rail service along the existing system could cease. The existing shippers along the rail line, accounting for approximately 60,000 rail cars per year, would lose rail service. Some shippers would be able to utilize trucks for transportation. Because one rail car transports the equivalent of 4 trucks, a significant number of additional trucks could be added to local roads. Other shippers would be unable to competitively convert to truck transport and would be required to relocate to areas with rail service or cease to operate. Many of these shippers include grain elevators serving the local agricultural communities. Loss of rail service and shippers would require local farmers to transport grain and other products greater distances for shipment, increasing operating costs for an already stressed agricultural economy. Increased reliance on trucks would increase air emissions from vehicles due to truck transport being less fuel efficient than rail. Wear on local roads would increase. Vehicle safety at grade crossings would not be an issue. However, increased levels of truck traffic would reduce the safety of area roads. Several hundred jobs in the project area associated with railroad operation and maintenance would be lost. Additionally, jobs provided by shippers forced to relocate or close would also be lost. Revenues generated to the counties through taxes and employee spending would be lost. Other business used by these employees would experience reductions in revenue. Loss of rail service throughout central and western South Dakota could result in a significant number of trucks being added to local roadways and economic hardship to those whose livelihood depends on the railroad, such as DM&E employees, shippers, and farmers.

4.4.2 INTRODUCTION - NEW CONSTRUCTION IMPACTS

The following discusses the potential impacts of each of the construction alternatives on the natural and human environment of the project area. New rail line construction would involve earthmoving and excavation within an acquired right-of-way[1] to create a suitable rail bed upon which rock ballast, rail, and ties would be installed. New bridges and culverts would be placed at stream crossings and new rail line would be installed over these structures. A detailed description of new rail construction is provided in Chapter 1.

4.4.3 CLIMATE

No impacts to the climate of the project area would result from any of the proposed new construction alternatives.

4.4.4 TOPOGRAPHY

Changes to the local topography along the proposed rail line could occur as a result of cut and fill activities, especially during construction of Alternatives B and C along the Cheyenne River. Numerous intermittent and perennial streams and a few rivers, including the Cheyenne River, would be crossed. A detailed discussion of the potential impacts to these waterways is found in Section 4.4.7.

4.4.5 GEOLOGY AND SOILS

4.4.5.1 Unique Geological Formations

Unique geologic formations are considered to be uncommon, unusual and or containing characteristics or qualities that make them of interest to science or the general public. Examples in the project area include the Badlands Formations in South Dakota and the Lance Formation in Wyoming. Alternative B would come the closest to unique geological formation of the Extension Alternatives. Alternative B would be constructed about 3,700 feet north of Badlands

[1] In its "Resource Technical Reports and Impact Assessment" for the proposed project, included as Appendix L, the USFS considered an average right-of-way width of 200 feet for all the Extension Alternatives. SEA determined that due to cut and fill requirements the average right-of-way width for Alternatives B and C would likely be greater than 200 feet. SEA therefore used an average right-of-way width of 400 feet for Alternatives B and C and 200 feet for Alternative D for its analysis in this Draft EIS when possible, to evaluate the potential impacts of the alternatives. However, for some resources, information supplied by the USFS provided the best available data. SEA used this data and has noted when a right-of-way other than 400 feet was the basis for the analysis.

National Park at its closest point in Section 32, T43N, R46W (see Map Number 217, Volume VI, Appendix A). Because none of the alternatives would cross through the park or any of the types of unique geologic formations it contains, no impacts would occur to unique geologic formations.

4.4.5.2 Geologic Hazards

The principle geologic hazard in the project area would be landslides. Significant impacts due to geological hazards would occur if:

- Landslides or slumps result from project activities.
- Project facilities are damaged by landslides.

In South Dakota and Wyoming, portions of all the alternatives cross the Pierre Shale and Fort Union formations. These formations are highly susceptible to landslides (Radbruch-Hall *et al.* 1976). The clay-mineral content of these rocks is moderate to high, making them susceptible to slumps and earth flows. The weak and erodible rocks have generally low to moderate relief, with some buttes and badlands; slopes are generally moderate to steep along drainage courses. Areas that have a moderate to high incidence of landslides are confined mostly to the valley walls of the Cheyenne River and its major tributaries. In these areas, cutting or loading of slopes or unusually high precipitation may cause landsliding. Flatter areas are also susceptible to landslides if slopes are steepened by construction activities. The potential for slumping along Alternatives B and C where these alternatives are immediately adjacent to the Cheyenne River was observed by SEA on-site and is evident on high resolution aerial photos (scale of 1 inch to 200 feet).

To compare the potential landslide susceptibility of each alternative, SEA first determined the distance each alternative would cross the Pierre Shale and Fort Union formations. In addition, SEA identified soils mapping units that the NRCS lists as prone to slumping and landslides (based on their slope, landscape position, soil descriptions) (NRCS, 1982 and 1996). SEA quantified and compared these mapping units to determine the amount of potential landslide hazard for each alternative.

Potential impacts from slumps and landslides would depend on the size and location of the slump or landslide. Potential impacts could include land or habitat disturbance as well as introducing additional sediment into drainages that may reduce water quality and habitat for aquatic resources. Slumps and landslides could be a potential safety concern during rail line operation if a landslide caused a derailment or damaged the rail bed. In areas where slumps and landslides are common and occur naturally (including areas of bank erosion where slumps or creeps fall toward the Cheyenne River), construction may require wider right-of-way disturbance to construct a stable surface for the rail bed. Some activities that may be required to stabilize

these areas could include excavating unstable material and reshaping slopes, providing positive drainage so that water drains away from the rail bed and away from potentially unstable slopes, and stabilization of river banks to reduce or eliminate undercutting.

Areas that are prone to slumping and landslides have been correlated to various soil mapping units. If construction triggered a landslide, the impact would be considered significant and long-term since landslides can be difficult to stabilize and can cause other significant environmental impacts such as habitat and water quality degradation. In addition, if slumps or landslides occur during operation, they could lead to rail bed instability, causing derailments and continued maintenance problems.

Alternative B (Proposed Action)

Alternative B would cross a total of 150.6 miles of the Pierre Shale and Fort Union formations. The potential for slumps or landslides would be high where this alternative would cross steep slopes or where cutting or loading of slopes or unusually high precipitation events may cause landslides. In South Dakota, approximately 40.8 miles (approximately 1,978.2 acres within the right-of-way) of the Pierre Shale Formation would be crossed. In Wyoming, 109.8 miles (approximately 5,323.6 acres within right-of-way) of the Pierre Shale and Fort Union formations would be crossed. In Wyoming, this alternative would not cross any known landslides (Larsen *et al.,* 1991a and 1991b), therefore the landslide potential along this alternative would likely be confined to those 40.8 miles in South Dakota where steep slopes adjacent to the Cheyenne River would be crossed.

Alternative C (Modified Proposed Action)

This alternative would cross a total of 135.0 miles of the Pierre Shale and Fort Union formations. As with Alternative B, the potential for slumps or landslides would be high where this alternative would cross steep slopes or where cutting or loading of slopes or unusually high precipitation events may cause landsliding in these formations. In South Dakota, 49.3 miles (approximately 2,390.3 acres within the right-of-way) of the Pierre Shale Formation would be crossed. In Wyoming, 85.7 miles (approximately 4,155.1 acres within the right-of-way) of the Fort Union and Pierre Shale formations would be crossed. In Wyoming, Alternative C would not cross any known landslides (Larsen *et al.*, 1991a and 1991b). The landslide potential along this alternative would likely be confined to the 49.3 miles in South Dakota where steep slopes adjacent to the Cheyenne River would be crossed.

Alternative D (Existing Corridors Alternative)

This alternative would cross a total of 164.2 miles of the Pierre Shale and Fort Union formations. In South Dakota, 69.9 miles (approximately 1,694.5 acres within the right-of-way) of the Pierre Shale Formation would be crossed and 94.3 miles (approximately 2,286.1 acres within the right-of-way) of the Fort Union and Pierre Shale formations would be crossed in Wyoming. Also in Wyoming, Alternative D would cross 2 very small areas where landslides have been reported (Larsen *et al*, 1991a and 1991b). One of these areas is located south of Newcastle in Sections 12 and 13, T. 4 S., R. 61 W.) in an area immediately east of the existing BNSF rail line. The other area is located northwest of Newcastle (Section 24, T. 2 S., R. 62 W.) and is also east of the existing BNSF railroad.

Alternative D would not be parallel to the Cheyenne River in South Dakota where steep slopes occur. Therefore, this alternative would cross the least amount of soils that have a high potential for slumps and landslides due to the lack of steep slopes occurring in the area. Only 2.1 miles (approximately 50.9 acres within the right-of-way) of those soils would be crossed in Wyoming.

4.4.5.3 Soil Impacts

Tables 4.1-2 and 4.2-2 list the soil groups that would be crossed by new construction. Potential impacts to soil resources would include:

- Loss of topsoil.
- Erosion, leading to soil loss and decreasing water quality.
- Loss of prime farmland soils through conversion to rail line right-of-way or from erosion.
- Introduction and establishment of noxious weeds from soil disturbance and disturbing or clearing existing vegetative cover.

With adequate mitigation measures to control erosion, prevention of topsoil loss, and control measures to prevent invasion of noxious weeds, impacts to most soil groups should be short-term, limited to the period of construction and revegetation. However, prime farmland soils within the right-of-way would be lost to agricultural production for the life of the project. Additional measures would need to be taken to ensure that compacted soils or soils that are difficult to reclaim are stabilized and revegetated as quickly as possible.

Alternative B (Proposed Action)

Construction would generally take place within the right-of-way acquired for the project. However, there would be extensive cuts and fills within this area to provide suitable grade for loaded coal trains. Right-of-way widths would range from 200 to approximately 600 feet for Alternative B, averaging approximately 400 feet. Based on this average right-of-way width and approximately 265.8 miles of new rail line construction, approximately 12,887.3 acres of soil would be disturbed during construction. This represents significant soil disturbance, exposing these areas to increased erosion. Alternative B would cross approximately 221.3 miles, (approximately 10,729.7 acres) of soils with a high erosion hazard (water, wind, or steep slopes).[2]

Alternative B would cross 20.9 miles (approximately 1,013.3 acres) of prime farmland in South Dakota. No prime farmland soils would be crossed by this alternative in Wyoming.

Soils in Pennington, Custer, and Fall River counties, South Dakota are prone to slumping and landslides. If slumps or landslides were to occur on these soils it would be considered a long-term impact because they can be difficult to stabilize. A total of 40.8 miles (approximately 1,978.2 acres) of these soil types would be crossed in these counties. Soil types in Wyoming are not prone to landslides or slumping along this alternative.

Alternative C (Modified Proposed Action)

Generally, Alternative C would have similar impacts as Alternative B. Extensive cuts and fills would be required for construction of this alternative with the right-of-way averaging approximately 400 feet. New construction of the 263.8-miles of new rail line for Alternative C would disturb approximately 12,790.3 acres of soil. While less than Alternative B, the soil disturbance for Alternative C would also be substantial. Alternative C would cross a total of approximately 208.2 miles of soils (approximately 10,094.5 acres) with a high erosion hazard in South Dakota and Wyoming.[3]

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[2] The total amount of soils with high erosion hazards represents the total length an alternative would cross of a soil type with a high hazard for erosion due to water, wind, or steepness. As a soil may have more than one of these hazards, the totals presented likely overestimate the total amount of such soils. However, they are presented as a comparison of the sensitivity of the soils crossed by each alternative to erosion.

[3] Ibid.

This alternative would cross 22.1 miles (approximately 1,071.5 acres) of prime farmland in South Dakota. No prime farmlands would be crossed by this alternative in Wyoming.

A total of 49.3 miles (approximately 2,390.3 acres) of soils prone to slumping and landslides would be crossed by Alternative C in South Dakota. No soils are prone to these hazards in Wyoming.

Alternative D (Existing Corridors Alternative)

Even though Alternative D is significantly longer than Alternatives B and C, it would be constructed within or adjacent to existing transportation corridors for much of its length. This would reduce the extent of cuts and fills required to establish the rail bed. The 233.2 miles of new rail line construction would have an average right-of-way width of approximately 200 feet, resulting in approximately 5653.3 acres of soil disturbance. Alternative D would have the least soil disturbance of the Extension Alternatives, but would also disturb a significant amount of soil. Alternative D would cross approximately 177.9 miles (4,312.7 acres) of soils with a high erosion hazard,[4] 49.8 miles (approximately 1,207.3 acres) in South Dakota and 128.1 miles (approximately 3,105.4 acres) in Wyoming.

A total of approximately 38.6 miles (approximately 935.7 acres) of prime farmland soil would be crossed by Alternative D. Approximately 37.6 miles (911.5 acres) of prime farmland would be crossed in South Dakota. Approximately 1.0 mile (24.2 acres) of prime farmland would be crossed in Wyoming.

Only 2.1 miles (approximately 50.9 acres) of soils that are prone to slumping and landslides are crossed in South Dakota and none in Wyoming, the fewest of all the alternatives.

4.4.5.4 Paleontological Resources

Impacts to paleontological resources would occur if important fossils, particularly vertebrate fossils, which could substantially add to scientific understanding of paleontological resources, are destroyed during project construction. There are world-famous paleontological deposits in the vicinity of all the Extension Alternatives. Fossils of dinosaurs and the ancestors of the modern day rhinoceros, horse, pig, and cat, early birds, reptiles, and invertebrates may be found in various strata which would be crossed by all of the Build-Alternatives. There are known paleontological sites adjacent to the alternatives and the possibility is high that paleontological

[4] Ibid.

resources of scientific significance could be disturbed or uncovered by earthmoving activities during construction of any of the Extension Alternatives.

Subsurface paleontological resources could be revealed during construction and excavation for any of the alternatives and would offer the opportunity to discover new specimens. Given the USFS and BLM standards and guidelines for protection of paleontological resources during construction, the possibility of irretrievably damaging a resource of scientific significance would be low on Federal lands. Because paleontological resources are not protected on private lands, scientifically significant specimens could be destroyed by any of the alternatives. The potential for loss of significant paleontological resources on private lands is therefore considered high, absent mitigation designed to protect these resources.

The USFS classifies an area's potential for containing paleontological resources as its Probable Fossil Yield Classification (PFYC). According to Beasley (1999), areas with a high potential for significant paleontological resources include all formations which have a PFYC rating of Class 3 or 5, with Class 5 being of highest potential. This classification is based largely on how likely a geologic unit is to produce vertebrate fossils of terrestrial (non-marine) origin. Because these classifications are based on geologic formations, they can also be determined on private lands adjacent to USFS lands. To quantify potential impacts to paleontological resources, crossing lengths through each PFYC (i.e., 3 and 5) are compared by alternative.

Alternative B (Proposed Action)

Alternative B would cross a total of 21.9 miles (approximately 1,061.8 acres) of formations with a PFYC of 5 in South Dakota. All of these formations occur on private lands. In Wyoming, the 7.3 miles (approximately 354.0 acres) of formations that have a PFYC of 5 all occur on Thunder Basin National Grasslands (TBNG). The remainder of Alternative B, approximately 230.6 miles (approximately 11,180.6 acres) of this alternative would cross formations that have a PFYC of 3.

Alternative B in Wyoming would cross approximately 2.0 miles (approximately 96.9 acres) of the 5,140 acre Thunder Basin Paleontological Special Interest Area (SIA) on the TBNG. This site is known to contain a high concentration of fossil remains from the late Cretaceous Period. This is the most productive fossil-bearing site on the TBNG. Standard stipulations and conditions of approval to construct through the SIA would reduce the potential for damage or destruction of paleontological resources. However, some inadvertent damage or destruction of paleontological resources could occur. Additionally, construction through this area could lead to the discovery and recovery of significant and important fossils, that, without this project may never have been discovered and available for science.

Alternative C (Modified Proposed Action)

Alternative C would cross a total of 37.9 miles (approximately 1,837.6 acres) of formations that have a PFYC value of 5. Of that total, 5.5 miles (approximately 266.7 acres) of the route would affect such rated formations in South Dakota. Of this South Dakota total, only 1.4 miles (approximately 67.9 acres) would be on Federal land, all of which is currently National Grassland. The remaining 32.4 miles (approximately 1,570.9 acres) would be in Wyoming with all of it being on private land. The remainder of Alternative C, approximately 209.9 miles (approximately 10,176.9 acres), would cross formations that have a PFYC of 3.

In Wyoming, this alternative would cross about 2.4 miles (approximately 116.4 acres) of the Thunder Basin Paleontological SIA, described above for Alternative B.

Alternative D (Existing Corridors Alternative)

This alternative would cross a total of 109.9 miles (approximately 2,664.2 acres) of formations with a PFYC of 5, the most of any alternative. In South Dakota, 56.5 miles (approximately 1,369.7 acres) of these geologic units would be crossed. In Wyoming this alternative would cross 53.4 miles (approximately 1,294.5 acres) with a PFYC of 5. Alternative D would cross 5.4 miles (approximately 130.9 acres) of these formations on the National Grasslands. This alternative would not cross the Thunder Basin Paleontological SIA. Because this alternative would cross the most formations with a PFYC value of 5 on private lands (104.5 miles, approximately 2,533.3 acres), it would have the greatest potential to significantly impact paleontological resources. Alternative D would also cross 189.3 miles (approximately 4,589.1 acres) of formations that have a PFYC of 3.

4.4.6 LAND USE

Impacts to land use would include:

- Degradation or preclusion of existing and legitimate land uses.
- Degradation of the enjoyment or value of adjacent property.
- Introduction of health risks, nuisances, or annoyances to areas where they did not previously exist.
- Loss of acres/animal use month (AUMs) within individual grazing allotments.
- Separating livestock from water sources either temporarily or permanently.
- Permanent obstruction of historic trails.
- Loss of cropland through conversion to rail line right-of-way or by making it unirigatable.

All the alternatives are expected to result in direct changes in current land use. This would occur through conversion of the existing land use to rail line right-of-way. Although this loss may be locally severe, on the overall landscape the loss would be relatively small.

Throughout South Dakota and Wyoming, the predominant direct land use conversions would occur in rangeland and cropland types. Impacts associated with conversion of these land use types are not anticipated to be significant and would amount to about 12 to 25 acres per linear mile of new railroad, depending on the right-of-way width required.

Noise and activities produced during construction, followed by railroad operation noise and activity would extend beyond the limits of the right-of-way corridor for all alternatives. Noise, human activity, and the presence of operating unit coal trains may degrade or preclude some existing land uses on adjacent lands (such as livestock grazing, recreation, and wildlife habitat).

4.4.6.1 Agricultural

4.4.6.1.1 Rangeland/Grazing

The primary impact to grazing resources would be the direct loss of forage area through its conversion to railroad right-of-way during construction. Other impacts associated with construction and operation of the rail line would include:

- fragmentation of grazing allotments and pastures due to the rail line bisecting allotments, allotment pastures, or pastures. Fragmentation resulting during construction would reduce allotment and pasture size which could affect the number or length of time livestock could be grazed. During rail line operation, additional time and effort would be required not only to move livestock from pasture to pasture more frequently but also to move them across an operating rail line.

- isolation of allotments or pastures from water sources, mineral licks, and improvements such as shelters, corrals, or windbreaks. These impacts could also occur from the rail line being constructed across allotments and pastures, resulting in water or other improvements being available on only one side of the rail line. Rail line fencing to prevent livestock from walking onto the rail line would prevent them from accessing the other side of the rail line where necessary resources would be available.

- disruption of ranching operations. Construction and operation of the rail line would likely interfer with the normal patterns of ranchers. Grazing rotations and patterns would need to be changed because some areas would be unavailable for grazing at the desired time due to construction activities. The presence of construction equipment, and trains during operation, would likely disturb livestock, particularly buffalo on those few ranches that raise them, making it difficult for ranchers to move livestock around construction equipment and the operating rail line. This disturbance would also cause livestock to avoid certain areas of the pasture, possibly even preferred or high-quality forage or watering areas, in an attempt to escape from the sights and sounds of construction and train operation. Over time, however, this avoidance may lessen as livestock become accustomed to operating trains. However, movement of livestock could still prove challenging.

- blocking of access to the allotments and disruption of livestock movements or trailing operations. Construction of the rail line would likely create allotments and pastures for which access is either not available without crossing the rail line or that requires inconvenient detours to access the area. As allotments and pastures are generally large, livestock using them have patterns of movement and use within the areas. Construction and operation of the rail line would create a barrier to some of these movements, possibly resulting in confusion and injury to livestock that may attempt to cross cattle guards or fences now in place along established paths. Additionally, ranchers have established patterns of trailing, or herding, livestock from one pasture to another. Often this is done on horseback. Less frequently, and much less efficiently, it is done by loading livestock into trailers or trucks for transport between pastures. New rail line construction would likely cross these established trails, preventing their use or increasing the difficulty of moving livestock over them due to the presence of the operating rail line. Some ranchers would likely be required to cease trailing livestock between pastures and resort to loading livestock, potentially several hundred individuals requiring numerous trips, onto trucks for transport to other areas.

- damage to range improvements. Construction of the rail line has the potential to damage or require removal of a variety of range improvements. These include windmills, water lines, watering tanks, ponds, corrals, barns and other outbuildings. Depending on construction requirements, such facilities that would be within the right-of-way would likely have to be removed or relocated.

- spread of noxious weeds. Disturbance to soil and existing vegetation during construction provides opportunities for establishment of noxious weeds. Noxious weeds include a variety of both native and introduced species that are of no forage value for livestock, may

be harmful or poisonous to livestock if ingested, or may outcompete beneficial forage species reducing the available forage and number of livestock a pasture can support. During rail operation, bare-ground areas maintained for fire prevention may also provide areas for establishment of noxious weeds. While the right-of-way would be off-limits to livestock, noxious weeds within the right-of-way would provide a seed source that would likely lead to the spread of such weeds into adjacent pastures.

- increased loss of livestock from vehicle-livestock collisions during the construction phase and collisions with trains during the operational phase. During construction, increased traffic on local and farm roads would result in vehicle operators, potentially unfamiliar with livestock, encountering them while operating vehicles or equipment. The livestock too would likely be unfamiliar with the level of traffic or equipment, causing them to become confused. Potential injury or loss of livestock could result. During rail line operation, in the event livestock gain access to the right-of-way, such as through a damaged fence, they could be struck and injured or killed by a passing train.

- loss of forage due to fire. Cinders from carbon buildup in the exhaust system of locomotives periodically break loose and are blown out of the exhaust system along with other emissions. Locomotives are equipped with spark arrestors to prevent these cinders from being released. However, sometimes sparks or cinders escape. Under the right conditions, if these sparks land in an area with a fuel source such as dry grass, they can ignite grass fires. These fires can quickly be spread by the constant and often strong winds in the project area, resulting in the loss of large areas of rangeland forage. Additionally, sparks may be generated by rail car braking or maintenance activities such as welding. These sparks may also result in range fires under conditions where combustible materials and wind are available and come in contact with the spark. Volunteer fire departments, frequently formed from area ranchers, find it difficult controlling fires because of the vast expanse of territory involved, the speed at which the fire frequently moves, and the often limited access for equipment to the fire location.

Alternative B (Proposed Action)

Alternative B would cross approximately 231.6 miles of rangeland. In South Dakota, approximately 90.3 miles (approximately 4,378.2 acres) of rangeland would be converted to railroad right-of-way. In Wyoming, approximately 141.3 miles (approximately 6,850.9 acres) would be converted.

Alternative B would cross 22 USFS and 6 BLM grazing allotments or allotment pastures in South Dakota. Crossing these allotments would impact approximately 560.6 acres and result in the loss of 152.1 AUMs.[5] In Wyoming, 57 USFS and 4 BLM allotments would be crossed by this alternative. Alternative B would convert approximately 2,146.7 acres to rail line right-of-way and would result in the loss of 411.6 AUMs in Wyoming.

Alternative C (Modified Proposed Action)

Alternative C would cross approximately 207.0 miles of rangeland. In South Dakota, approximately 75.8 miles (approximately 3,673.2 acres) of rangelands would be converted to railroad right-of-way. In Wyoming, approximately 121.6 miles (approximately 5,895.7 acres) of rangeland would be lost.

In South Dakota, Alternative C would cross 13 USFS and 6 BLM grazing allotments. The total amount of allotment disturbance would be approximately 373.3 acres and result in the loss of 79.6 AUMs. In Wyoming, 43 USFS and 4 BLM allotments would be crossed by Alternative C. The total acres of allotment disturbance would be approximately 2,146.7 and result in the loss of 411.6 AUMs.

Alternative D (Existing Corridors Alternative)

Alternative D would cross 264.5 miles of rangeland. In South Dakota, a total 119.1 miles (approximately 2,887.2 acres) of rangeland would be converted to the railroad right-of-way. In Wyoming, a total of 145.4 miles (approximately 3,524.8 acres) of rangeland would be converted.

In South Dakota, 3 BLM allotments would be crossed. The total amount of allotment loss would be 32.4 acres and result in the loss 6.2 AUMs. No USFS allotments would be affected in South Dakota.

In Wyoming, 38 USFS and 6 BLM allotments would be crossed by Alternative D. The total amount of allotment loss would be approximately 1,287.6 acres, resulting in the loss of 231.9 AUMs.

[5] Impacts to USFS and BLM allotments were calculated by the USFS and based on a 200-foot wide rail line right-of-way.

4.4.6.1.2 Cropland

Cropland composes a small but important land use throughout the project area. The importance of cropland is primarily in the hay, small grains, and other crops raised to provide feed for livestock, particularly during the winter months. Much of the cropland is found within the river valleys where a more dependable supply of water is available or soil moisture is sufficient to support crops. Croplands are often dependent on irrigation, either by movable sprinkler systems or flood irrigation systems, for dependable crop production.

Construction of a new rail grade across croplands would result in the conversion of cropland to rail line right-of-way. Any crops in the right-of-way would be lost during construction activities. Land within the right-of-way would no longer be available for agricultural production. The crossing of croplands would divide large fields into smaller ones, potentially creating problems to access certain fields, or portions of fields, or make them impractical or unprofitable to continue to farm. Construction activities also have the potential to damage irrigation structures and equipment.

During rail line operation, the new rail bed would create a levee across flood-irrigated fields. In such fields, water provided to a field would be unable to spread out over the entire field, only irrigating the portions on the side of the rail line where water would be applied. Moveable irrigation structures designed for large fields would require modification or replacement to function properly on the smaller fields or would cease to be usable. Portions of or entire previously irrigated fields could no longer be irrigable, resulting in lost productivity and crop revenue.

Fields that would continue to be farmed would have the added obstacle of an operating rail line adjacent to them. Farmers would be inconvenienced by having to move equipment across the rail line, potentially placing them in the path of operating trains at public grade crossings or at unimproved farm crossings. If access across the rail line is not readily available, farmers could be forced to move equipment significant distances on local roadways to reach their fields. Movement of large, slow moving farm equipment on public roads would create safety concerns for both farmers and the vehicles they would encounter.

Alternative B (Proposed Action)

Alternative B would cross approximately 23.7 miles of cropland. Approximately 16.0 miles (approximately 775.7 acres) of cropland would be crossed in South Dakota. Alternative B would cross approximately 7.7 miles (approximately 373.3 acres) in Wyoming.

Alternative C (Modified Preferred Alternative)

Alternative C would cross approximately 27.0 miles of cropland. Approximately 18.0 miles (approximately 872.7 acres) of cropland would be crossed in South Dakota. Alternative C would cross approximately 9.3 miles of cropland (approximately 450.9 acres) in Wyoming.

Alternative D (Existing Corridors Alternative)

Alternative D would cross approximately 50.4 miles of cropland. Approximately 42.3 miles (approximately 1,025.4 acres) of cropland would be crossed in South Dakota. Alternative D would cross 8.4 miles (approximately 203.6 acres) of cropland in Wyoming.

4.4.6.2 Residential

Residential land in the project area is limited to small, widely scattered areas associated with small towns or communities. However, construction activities through or near residential areas could result in temporary construction and longer term operational impacts. Such impacts would include noise and light disturbance to nearby residents during construction, safety hazards to children, increased traffic and congestion from construction equipment and vehicles, and fugitive dust. These impacts would be similar to those described in Section 4.3.6.2. In addition, construction of new rail line would require acquisition of new right-of-way, potentially requiring removal or relocation of residences as discussed below for each alternative.

Alternative B (Proposed Action)

Approximately 0.3 mile of residential land would be crossed by the proposed rail line. All this land would be in South Dakota and include the town of Smithwick. Through Smithwick, Alternative B would consist of the reconstruction of the existing DM&E rail line. As no additional right-of-way is anticipated for this portion of Alternative B, no residential land would be lost.

Alternative B would pass adjacent to an area of residential land at Edgemont. Although land classified as residential would not actually be crossed, construction and operation of a new rail line in close proximity to residential land would have similar impacts as those to residential land actually crossed. However, Edgemont is a small community through which an active BNSF rail line passes. Impacts from this project would be similar to those currently occurring to Edgemont residents. While no new impacts would be anticipated, the frequency of their occurance would be expected to increase with the addition of DM&E rail traffic.

No residential areas would be affected in Wyoming. However, the same type of impacts would be experienced by the scattered ranches within the project area.

Alternative C (Modified Preferred Alternative)

Because Alternative C follows the same alignment as Alternative B through Smithwick, Alternative C would also pass through the approximately 0.3 mile of residential land at Smithwick. No other residential land would be crossed by Alternative C. Additionally, Alternative C would be further (nearly a mile at its closest) from the residential areas at Edgemont and would therefore have only limited affect on them.

No residential land use areas are located along this alternative in Wyoming. However, there are scattered ranches that would experience the same type of impacts.

Alternative D (Existing Corridors Alternative)

Approximately 5.9 miles of residential land would be crossed by Alternative D. In South Dakota, this alternative would pass through several towns and communities, including Wall, Wasta, New Underwood, Box Elder (near Ellsworth Air Force Base), Rapid City, Hermosa, Fairburn, and Smithwick, comprising most of the 3.8 miles of residential land crossed in South Dakota. With the possible exception of Rapid City, Alternative D would involve reconstruction of DM&E's existing rail line through these communities. Reconstruction activities would be restricted to the existing DM&E right-of-way, resulting in no loss of residential land or the removal or relocation of residences. In Rapid City, some realignment of DM&E's existing rail line may be required due to current sharp curves. Realignment would likely require acquisition of new right-of-way and may require removal of some residences and businesses, particularly in the area where the existing rail line would turn south. Final design of this alternative, should it be approved, would be required to determine the exact impacts it would have in Rapid City.

In Wyoming, this alternative would pass through the residential communities of Newcastle, Osage, Upton, and Moorcroft. The majority of the 2.1 miles of residential land crossed by Alternative D in Wyoming would be through these communities. Acquisition of residential land, relocation, or removal of residences in these communities would be likely due to Alternative D paralleling the existing BNSF rail line through these communities. As residences currently occur along the BNSF rail line, insufficient land space is available for a second rail carrier to construct a new rail line. While DM&E may be able to reduce its right-of-way requirements through these areas to limit the amount of land required, it would likely be necessary to remove or relocate some residences.

4.4.6.3 Business and Industrial

As with residential land, business and industrial land is also widely scattered in the project area and generally restricted to small areas of the small towns and communities. During construction near businesses and industries, noise, traffic and construction congestion, and reduced access to patrons could inconvenience proprietors, employees, and patrons and affect the conducting of business. Following completion of construction activities in the vicinity of the business, these impacts would cease. Construction impacts would then be replaced with increased noise, traffic delays, reduced access, and grade crossing safety concerns from operating trains. Additional rail access could offer businesses and industries the opportunity to utilize rail for some of their transportation needs or encourage new facilities to locate along the rail line. Properties suitable for industrial development along the existing rail line would be expected to increase in value. These impacts are explained in more detail in Section 4.3.6.3.

Alternatives B and C would not cross any land identified as business or industrial. No impacts are expected to occur to these land uses during construction, as no businesses or industries are located in close proximity to the proposed rail line corridor. During rail line operation, the opportunity to obtain rail service may attract businesses to the area along these alternatives for future development. Property values may increase in areas suitable for commercial development.

Approximately 6.8 miles of business and industrial property would be crossed by Alternative D. Construction activities in or near these areas, found in Rapid City, Newcastle, and Moorcroft, would experience the temporary impacts related to inconvenience to employees and patrons from accessability problems, noise, dust, and congestion generated by construction equipment, vehicles, and workers. These impacts would be short-term, occurring only while construction is occurring in the vicinity of the business. Some temporary reductions in patronage may occur due to patrons selecting to do business at other establishments rather than cope with any construction related inconvenience. However, following construction, patrons would be expected to return. Other businesses, particularly those such as restaurants, convenience stores, and motels, may see an increase in patronage due to use by construction workers. Depending on final design and right-of-way requirements, it may be necessary to remove or relocate businesses or industrial facilities, particularly in Rapid City, Newcastle, and Moorcroft, due to their proximity to the existing DM&E or BNSF rail lines. In Rapid City particularly, the need to realign a sharp curve appeared to SEA to likely require the removal of one or more businesses to provide a reasonable curve for movement of unit coal trains.

Some businesses and industries located along Alternative D are currently provided with rail service by either DM&E or BNSF. Operation of Alternative D would provide an improved rail line and likely improved rail service to shippers along the existing DM&E rail line portion of Alternative D. Other potential rail shippers along this portion of the alternative may take advantage of the improved rail line and utilize rail for some of their transportation needs. Shippers along the existing BNSF portion of Alternative D would have two rail carriers to choose from, potentially enabling them to obtain better shipping rates or service. Expanded transportation options through the inclusion of rail service and a better ability to compete may enable these businesses and industries to increase their profit margins and expand their operations. The value of these operations would be increased, as well as the real estate they occupy. Additionally, efficient and competitive rail service along Alternative D may make the region attractive to new business and industry.

4.4.6.4 Minerals and Mining

The mineral resources in western South Dakota and eastern Wyoming are among the most productive in the United States. Construction and operation of the new railroad would likely have a positive impact on the mineral and mining industry in this area. Approximately 1.2 miles of these resources would be crossed by Alternative B. Alternative D would cross approximately 1.9 miles of mining and quarry lands. No mining or quarry land would be crossed by Alternative C.

Sand, Gravel and Rock

Sand and gravel is currently quarried throughout the project area. Much of the quarried material is used locally for roads and other projects. DM&E has indicated it plans to utilize local sources of sand and gravel for construction of the new rail line to the extent possible and practical. Local limestone and other rock may be suitable for ballast or other needs and would also be utilized. The utilization of locally quarried material for rail bed and rail line construction would result in fewer transportation impacts associated with shipping the material from distant locations, either by truck or rail. It would also provide an increased local market and demand for these materials. However, local increases in noise, dust, and truck traffic may occur from increased quarry activities. These impacts would be the same for each alternative. However, different quarry areas would potentially be utilized due to their location in relation to the alternative approved and whether the materials they contain are suitable for rail line construction.

In addition to rail line construction activities, an increase in sand, gravel, and rock demand may also occur as part of road construction and maintenance projects associated with rail line construction. Upgrading existing roads may be necessary to support rail line construction vehicles and equipment, requiring these types of materials. Additionally, existing roads may be closed and

rerouted. New roads may also be necessary to provide access to construction areas. These projects would require materials from local quarries. In some cases, quarries with material unsuitable for rail line construction may be usable for these types of road projects, providing a demand and market for material in additional quarries.

Coal

As stated in Chapter 1, one of the purposes for the construction and operation of this project is to access the coal reserves in the PRB. A positive impact to the coal mining industry of the PRB is expected to occur as a result of DM&E gaining access to PRB coal mines. Each alternative would provide an additional rail carrier access to the regions coal mines, providing the opportunity for increase rail competition, leading to better transportation rates for PRB coal. Alternatives B and C would provide significantly shorter routes for rail transportation of coal to certain markets (Chapter 1, Section 1.3.2), potentially increasing the market for the regions coal. Because of its additional distance over Alternatives B and C, Alternative D may not necessarily provide a more efficient route for transport of PRB coal. However, the presence of an additional rail carrier, increasing rail competition could still make Alternative D attractive as a route for some shippers, encouraging them to start using or increase current use PRB coal. This would have a positive impact on PRB coal resources.

4.4.6.5 Federal Lands

4.4.6.5.1 Forest Service Lands

The vast majority of U.S. Forest Service (USFS) lands that would be crossed (including all lands on TBNG) are classified as roaded natural, rural or urban. An operating railroad would be compatible with these Recreation Opportunity Spectrum (ROS) designations (Section 4.1.4.6 and 4.2.4.6). However, semi-primitive motorized lands, which are present in South Dakota are expected to be predominately natural or natural appearing. The presence of a railroad would not be compatible with such a designation. Amendments to the current Forest Management Plans would be required. The proposed amendments are provided in Appendix L. Additionally, the presence of a rail line would impact USFS lands classified as RARE II or roadless (Sections 4.1.4.6 and 4.2.4.6). USFS lands used for rail line right-of-way would no longer be available for public use for recreation or leased for grazing due to safety concerns as presented in the Forest Service Resource Technical Report (Appendix L).

The National Forest Management Act (36 CFR Part 219.10(e)) requires consistency between any project being proposed and the national forest land and management plan (forest plan) for any forest or grassland being affected by the project. In this case, the USFS evaluated

two existing forest plans for consistency between the proposed Extension Alternatives alternatives and forest plan standards and guidelines, as well as whether or not the proposed Extension Alternatives would be consistent with the desired future condition of the national forest system lands affected. The two forest plans evaluated were the Medicine Bow National Forest Land and Resource Management Plan, 1985, and the Nebraska National Forest Plan, 1984. The USFS determined that if an Action Alternative is selected, both of these forest plans will have to be amended because any Action Alternative will not, in many cases, be consistent with the management standards and guidelines of these forest plans. Therefore, a Forest Plan Amendment for both the Medicine Bow National Forest Plan and the Nebraska Forest Plan will be required before the USFS could issue a special use permit for the proposed project. These amendments are included in this analysis (Appendix L) for public comment and will become a part of the Forest Service Record of Decision.

Alternative B (Proposed Action)

Alternative B would cross approximately 51.9 miles of lands managed by the USFS as part of the National Grasslands. Approximately 16.3 miles (approximately 790.3 acres) of the Buffalo Gap National Grassland (BGNG) in South Dakota and 35.6 miles (approximately 1,726.1 acres) of the Thunder Basin National Grassland (TBNG) in Wyoming would be crossed.

Alternative B would be located within 500 feet of lands currently managed by BGNG as semi-primitive non-motorized. In the NE of Section 16, T4S, R11E., semi-primitive non-motorized USFS lands would be separated from Alternative B only by the Cheyenne River. Because of the rail line's close proximity to this area, it is likely that noise from construction and operation of a railroad and visual disturbance and intrusion from these activities along the Cheyenne River adjacent to an area with this Recreation Opportunity Spectrum (ROS) designation would degrade the recreation experience of those enjoying the area's wilderness-like qualities. Because there are no roads which would be crossed in this area, noise disturbance from locomotive whistles should not be a problem. However, locomotive and wayside train noise would likely cause disturbance to portions of these areas, degrading the recreational experience, including the feeling of isolated wilderness they provide visitors.

In South Dakota, two roadless areas would be crossed by Alternative B and a third would be separated from it by the Cheyenne River. All three of these roadless areas would be significantly affected by Alternative B. Alternative B would pass through the southeastern edge of the Red Shirt RARE II Area near the Village of Red Shirt. It would pass through the southern edge of the Cheyenne River RARE II Area. Alternative B would also cross the Red Shirt Inventoried Roadless Area. The crossings of these areas by the rail line would likely prohibit their current classification as roadless and require the USFS take measures to redesignate them as well

as eliminate portions of both areas from future consideration for inclusion in the National Wilderness System. Indirect noise disturbance to the nearby Indian Creek RARE II Area would likely have a similar impact to this area.

On TBNG, this alternative would be adjacent (within approximately 200 feet of the rail centerline) to the H A Divide Inventoried Roadless Area. Like BGNG, the sights and sounds introduced into the area would significantly reduce the wilderness-like qualities of this area.

Alternative C (Modified Proposed Action)

Alternative C would cross approximately 38.9 miles (approximately 1,886.1 acres) of lands managed by the USFS as part of the National Grasslands. Approximately 6.1 miles (295.7 acres) of USFS land would be crossed in South Dakota, on the BGNG. The remaining 32.8 miles (1,590.3 acres) would be part of the TBNG in Wyoming.

Alternative C would not cross any lands designated as RARE II. Lands with the ROS designation of semi-primitive motorized lands would be crossed by Alternative C in the Spring Creek drainage area.

Although Alternative C does not cross any RARE II areas, it would be within 500 feet of the Red Shirt and Cheyenne River RARE II areas and the Red Shirt Roadless Area. Noise from the operating railroad, while not as severe as from Alternative B and impacting other portions of these areas, would be expected in these areas. Such noise impacts would be expected to degrade the wilderness qualities that make these areas potentially eligible for inclusion in the National Wilderness System.

Alternative D (Existing Transportation Corridor)

Alternative D would cross approximately 26.7 miles (approximately 647.3 acres) of USFS lands that are part of the TBNG. These lands would no longer be available for public use. No roadless or RARE II areas would be crossed by Alternative D.

4.4.6.5.2 Bureau of Land Management Lands

Lands managed by the BLM generally occur throughout the project area as small, isolated parcels. Their primarily use is as rangeland. Impacts to BLM lands would be similar to those described in Section 4.4.6.1, as well as removal of these lands from public use.

Alternative B (Proposed Action)

Alternative B would cross approximately 5.7 miles of lands managed by the BLM. In South Dakota, Alternative B would cross approximately 3.3 miles (approximately 160.0 acres) of BLM lands. In Wyoming, this alternative would cross 2.4 miles (approximately 116.4 acres) of BLM managed lands.

Alternative C (Modified Proposed Action)

Alternative C would cross approximately 4.9 miles of BLM lands. In South Dakota, Alternative C would cross approximately 3.4 miles (approximately 164.8 acres) and in Wyoming this alternative would cross approximately 1.5 miles (approximately 72.7 acres) of BLM lands.

Alternative D (Existing Transportation Corridor)

Alternative D would cross approximately 3.0 miles of BLM lands. In South Dakota, Alternative D would cross 1.3 miles (approximately 31.5 acres) of BLM lands. In Wyoming, it would cross approximately 1.7 miles (approximately 41.2 acres) of public lands. However, in Wyoming, Alternative D would cross BLM lands adjacent to an existing rail line. Impacts such as fragmentation of pastures, isolation of water sources, and displacement of livestock are not expected to be as significant as the other alternatives because only a narrow stretch of land would be lost to the additional rail line right-of-way.

4.4.6.5.3 Bureau of Reclamation Lands

Angustora Irrigation Project

Section 4.1.4.6.4 gives a detailed description of the Angustora Irrigation Project. No impacts are expected to occur to project lands or the Irrigation District as a result of construction and operation of Alternatives B, C or D. However, impacts to the Angustora Irrigation Project lands and Irrigation District would result from construction and operation of the WG Divide Alternative. These impacts are discussed in Section 4.6.

4.4.6.5.4 Fish and Wildlife Service Lands

No USFWS lands are crossed by any of the proposed Extension Alternatives. No impacts to USFWS lands would occur as a result of construction and operation of this portion of the proposed project.

4.4.6.5.5 U.S. Department of Energy Lands

Lands under management of the U.S. Department of Energy (DOE) would be crossed by Alternative B. Only Alternative B would cross DOE lands. Alternative B would cross approximately 0.3 mile (approximately 14.5 acres) of a portion of a 360-acre parcel of DOE land in Fall River County, approximately 2.5 miles southeast of Edgemont. This parcel is the former site of a uranium milling facility and tailing disposal. The site has been closed and cleaned up so as to no longer pose any threat. However, construction of a rail line across the site would require surface disturbance which is prohibited on this parcel. If Alternative B is selected, SEA would need to conduct consultation with DOE to determine if the parcel could be safely crossed, or a realignment of Alternative B would be necessary.

4.4.6.6 Reservation and Treaty Lands

No Native American Reservations would be crossed by any of the project alternatives. However, Alternative B would be between a few hundred feet and 0.5 mile from the Pine Ridge Reservation for approximately 13.6 miles. Construction activity, noise, and dust could be noticed on the Reservation. Erosion from the disturbed right-of-way and stream crossing of the Cheyenne River could reduce water quality in the Cheyenne River adjacent to the Reservation. The Cheyenne River is an important resource to Reservation inhabitants for water, fish, and recreation. Additionally, any contaminants spilled into the river during construction could reduce water quality for Reservation inhabitants.

During rail line operation, increased levels of noise from operating trains would be observed on the reservation adjacent to Alternative B, particularly at Red Shirt. Trains whistle sounding would be unnecessary along most of the Reservation due to the lack of roads. However, whistle sounding at State Highway 40 would be noticable by Red Shirt residents, although they would not be within any of SEA's calculated noise contours (Section 4.4.9). On calm nights, locomotive and wayside noise would also be noticable. Alternative B would also present concerns for water quality in the Cheyenne River should a spill of coal or hazardous materials into the river occur. The visual appearance of the areas across the Cheyenne River from the Reservation would also be permanently altered by the addition of a rail bed and operating railroad.

Rail line construction and operation would, however, provide employment opportunities for Native Americans living on the Reservation. The generally close location of Pine Ridge to all the Extension Alternatives would provide the opportunity for Native Americans to obtain temporary employment during construction and permanent jobs during operation while maintaining residency on the Reservation. DM&E has indicated it will work with Tribal

representatives to provide opportunities for Native Americans, as indicated by its participation in the Memorandum of Agreement (MOA) between the Board, participating Tribes, and DM&E (Appendix I).

As noted in Section 4.1.4.7, the counties of Pennington, Custer, and Fall River are still considered by several Tribes to be the property of the Sioux Nation by treaty. These lands are currently held in ownership by the Federal government, State of South Dakota, or privately. All of the Extension Alternatives would cross these counties.

4.4.6.7 State Lands

Lands owned and managed by the states of South Dakota and Wyoming occur throughout the project area. While in other parts of South Dakota, state lands include GPAs and state parks, state lands along the Extension Alternatives are all leased to local ranchers for grazing. In Wyoming, state lands are also leased to ranchers for grazing. In some cases, access to these lands is restricted to the ranchers leasing the land. Others are open to the public.

Alternative B

Alternative B would cross approximately 10.1 miles of state land. It would cross approximately 2.7 miles (approximately 130.9 acres) of state land in South Dakota. Approximately 7.4 miles (358.8 acres) of state land would be crossed by Alternative B in Wyoming. All this land is used for grazing. Construction and operation of a rail line across these lands would have impacts similar to those described in Section 4.4.6.1.

Alternative C

Alternative C would cross approximately 11.7 miles of state land. It would cross approximately 2.1 miles (approximately 101.8 acres) of state land in South Dakota. Alternative C would cross approximately 9.6 miles (approximately 465.4 acres) of state land in Wyoming.

Alternative D

Alternative D would pass through or cross approximately 10.9 miles (approximately 264.2 acres) of state-owned land. In South Dakota, Alternative D would pass through approximately 2.0 miles of state land. These lands are currently adjacent to DM&E's existing right-of-way. This portion of DM&E's existing rail line would be rebuilt as part of Alternative D. SEA expects that additional right-of-way would be required along DM&E's existing rail line in order to optimize the alignment so that it would be suitable for unit coal trains. However, no

determinations of how much additional right-of-way would be required at these locations has been prepared by DM&E. Therefore, while some loss of state land in South Dakota would be expected from Alternative D, the amount can only be estimated at this time, rather than precisely quantified. Alternative D would cross approximately 8.9 miles (approximately 215.7 acres) of state land in Wyoming.

4.4.6.8 Utility Corridors

Numerous utilities of all types would be crossed by the newly constructed rail line or utilized by new rail line right-of-way. Construction and operation of the new rail line would have the potential to damage these utilities, resulting in loss of product, customer service, and in the case of natural gas or petroleum products, create potentially dangerous situations. DM&E would need to identify all utilities within the new right-of-way and coordinate with the owners of those utilities to insure they are properly protected during reconstruction, and determine if they would require relocation or reconstruction to prevent future damage from rail operations. Provided this is done, the project would have no significant impacts on utilities.

4.4.7 WATER RESOURCES

Impacts to water resources would include:

- Construction runoff causing sedimentation in project area waterways.
- Disturbance of the stream corridor, resulting in erosion and sedimentation degrading water quality.
- Stream channel modifications resulting in changes to waterway hydrology.
- Impairment or destruction of groundwater supplies by construction of the alternatives, or contamination if spills of fuel or other hazardous materials occurr and enter the aquifer.
- Loss of wetlands and riparian communities.

4.4.7.1 Surface Water

Installation of bridges and culverts has the potential to increase erosion into surface waters and disturb bottom sediments. These impacts would result in increased total suspended solids (TSS) in surface waters, increasing stream sedimentation, changing sediment loading and depositon patterns in the stream, and reducing surface water quality. Construction activities at existing and new stream crossings would disturb vegetation adjacent to the stream, increasing the potential for erosion. Soil-disturbing activities and excavation would have similar affects. In-stream work, particularly if vehicles are required to move into or across streams, would disturb bottom sediments and stream banks, also contributing to increased sediment in the water. Bank

stabilization and channelization may be necessary for some crossings. These have the potential to change stream hydrology, altering water flow velocities and sediment loading and deposition patterns. Increased water temperatures, stream bank erosion, incising of stream channels, and reduction in stream meanders could result. Spills of fuel, lubricants, solvents, or other hazardous materials during construction at stream crossings could introduce contaminants into the water, reducing water quality. However, any contaminants are expected to be present in small amounts, consisting of that amount necessary for operation of equipment and insufficient to cause significant impacts to surface water quality beyond local reductions during construction.

The potential for these construction impacts would be limited to the short period required for crossing construction, indicated by DM&E to be approximately 14 days for bridge construction and 1 to 2 days for culverts. Surface water impacts would be of highest concern during construction of crossings of perennial streams, as water would be present in the stream bed, and during high water periods. However, as much of the year is relatively dry in the project area, resulting in the majority of streams crossed being intermittent, construction impacts to surface waters would primarily occur to those few perennial streams crossed. It is likely many of the intermittent stream crossings could be installed and reclamation measures implemented without water ever being present in the stream channel. In these instances, should a spill of hazardous substances occur, it could be contained and cleaned up without impacting surface water resources.

During rail line operation, surface waters could be impacted in the event of a derailment. Should diesel fuel or lubricants be released from locomotives or rail cars involved in a derailment, they could reduce local water quality. Severe spills of fuel could degrade water quality for a substantial distance downstream of the spill until the spill is contained or diluted. Additionally, increased TSS would likely result if a derailment resulted in coal being spilled into the water. While these impacts could occur, they are considered unlikely due to the rail line being maintained in good condition and the derailment needing to occur at a perennial stream crossing.

The infrequent (necessary only once every several years) disturbance to bottom sediments and stream banks associated with bridge or culvert maintenance activities would be the most likely impact during rail line operation. Such disturbances would be minor because they would involve little in-stream work or site disturbance. Additionally, during railroad operation, herbicide application within the rail line right-of-way to control vegetation could reduce water quality if herbicides are improperly applied or allowed to enter surface water.

Alternative B (Proposed Action)

Alternative B would cross 20 perennial streams and 623 intermittent streams. In South Dakota, it would cross 14 perennial streams, including 3 crossings of the Cheyenne River, and 208 intermittent streams, 4 of which are currently crossed by an existing rail line. In Wyoming, this alternative would cross 6 perennial streams and 415 intermittent streams. Alternative B would pass within 500 feet of the Cheyenne River and its perennial stream drainages for a total of 21.9 miles.

Alternative C (Modified Proposed Action)

Alternative C would cross 14 perennial streams and 520 intermittent streams. In South Dakota, this alternative would cross 10 perennial streams, including 3 crossings of the Cheyenne River and 230 intermittent streams, 5 of which are currenty crossed by an existing rail line. In Wyoming, this alternative would cross 4 perennial streams and 290 intermittent streams. Approximately 20.8 miles of Alternative C would be within 500 feet of the Cheyenne River and its perennial tributaries.

Alternative D (Existing Corridors Alternative)

Alternative D would cross 68 perennial and 707 intermittent streams. In South Dakota, Alternative D would cross 45 perennial streams, and 312 intermittent streams. Alternative D would cross the Cheyenne River twice in South Dakota. Of Alternative D's stream crossings, 40 perennial (including 2 of the Cheyenne River) and 197 intermittent stream crossings would be existing crossings where crossing structures would be rebuilt or replaced. In Wyoming, Alternative D would cross 23 perennial streams and 395 intermittent streams. Less than 13.5 miles of Alternative D would be within 500 feet of the Cheyenne River and tributaries.

4.4.7.2 Wetlands

Impacts to wetlands are considered by the U.S. Army, Corps of Engineers (COE) to be temporary, long-term, or permanent, depending on the amount of time it would take for the reestablishment of a functional wetland.[6] Reestablishment within three years after construction is considered a temporary impact. However, any reestablishment that takes longer than three years is considered long-term. The non-recoverable loss of a particular wetland or riparian area

[6] A reestablished wetland would be considered to be a functional wetland at such a time as it is capable of providing the functions performed by the original wetland. Such functions could include surface water retention, nutrient uptake, and wildlife habitat.

function is considered permanent. Construction of the alternatives would have the following impacts on wetland and riparian resources:

- Permanent loss or alteration due to placement of fill or dredging of substrate during construction, resulting in a change in hydrology, soils, or the composition of vegetation which could be temporary, limited to the construction period, or permanent throughout operation of the rail line.

- Permanent or temporary degradation of the functions of wetland or riparian resources.

Wetlands located within the rail line right-of-way would be lost during construction of the rail line. Sections 4.1.5.3 and 4.2.5.3 describe the various types of wetlands found throughout the project area and potentially lost. Clearing of vegetation, excavation, grading, and placement of fill to create a raised rail bed would destroy them. Additionally, if these wetlands extend outside the right-of-way, adjacent areas of wetlands may also be lost due to changes in surface water drainage flow, erosion, and sedimentation. Installation of rail line drainage structures may result in adjacent wetlands being drained. These indirect impacts are difficult to quantify due to lack of final design information. However, it is likely some wetlands would reestablish within the rail line right-of-way. These wetlands would likely be similar to those lost but smaller in size and of less value.

During project operation and maintenance, wetlands reestablished in the right-of-way may be subject to impacts similar to those of construction should maintenance activites require work in wetlands. These impacts would be sporatic and in confined areas. Contaminants, such as fuel and lubricants, and herbicides could enter wetlands, damaging vegetation and contaminating water or soil due to improper handling, use, or in the unlikely event of a derailment.

To quantify potential impacts to wetlands along each alternative, the wetland acres were determined based on USFWS National Wetland Inventory (NWI) mapping.[7]

[7] National Wetlands Inventory (NWI) mapping is performed by the U.S. Fish and Wildlife Service (USFWS). Aerial photography is used to identify potential wetland areas, based on observations of water or vegetation in the photographs. NWI maps provide a useful guide as to the potential for wetlands. However, they may indicate wetlands where they do not actually exist, and may also indicate uplands in areas where wetlands do exist. Additionally, indicated wetlands are not based on criteria established by the U.S. Army Corps of Engineers for wetlands under its jurisdiction as per the Clean Water Act. Use of NWI maps does however, provide a useful means of comparing the potential wetland impacts of alternatives.

Alternative B (Proposed Action)

Alternative B would cross approximately 1.2 miles of wetlands, resulting in the loss of approximately 62.1 acres of wetlands. Wetlands lost would include approximately 33.2 acres of emergent, approximately 16.5 acres of aquatic bed, approximately 8.7 acres of unconsolidated bottom, and 3.7 acres of scrub/shrub or forested wetlands (based on a 400-foot wide right-of-way). In South Dakota wetlands occur along approximately 0.8 mile of Alternative B, in Wyoming wetlands occur along approximately 0.4 mile of Alternative B.

Alternative C (Modified Proposed Action)

Alternative C would cross approximately 1.3 miles of wetland, resulting in the loss of approximately 62.2 acres of wetlands. Wetlands lost would include approximately 39.2 acres of emergent, 18.9 acres of aquatic bed, 2.9 acres of unconsolidated bottom, and 1.2 acres of scrub/shrub or forested wetlands (based on a 400-foot right-of-way). In South Dakota, wetlands are found along approximately 1.0 mile of the proposed new rail right-of-way. In Wyoming, wetlands occur along approximately 0.3 mile of new rail right-of-way.

Alternative D (Existing Corridors Alternative)

A total of approximately 1.6 miles of wetlands, approximately 40.7 acres, including approximately 26.4 acres of emergent, 11.0 acres of aquatic bed, 2.6 acres of unconsolidated bottom, and 0.7 acre of scrub/shrub or forested wetlands, would be within the new rail line right-of-way and lost during construction (based on a 200 foot right-of-way). In South Dakota, wetlands occur along approximately 0.4 mile of the new right-of-way. In Wyoming, wetlands are found along approximately 1.2 miles of the new right-of-way.

4.4.7.3 Groundwater and Wells

Construction and operation of the proposed project has the potential to impact groundwater and wells throughout the project area. Each of the Extension Alternatives has the potential to have similar impacts. During construction, cut activities could expose shallow aquifers, causing their water levels to be lowered. Shallow, low-yield wells used for watering livestock could have their yields reduced or stopped. DM&E has indicated it would likely obtain some of its water needs during construction from local wells, subject to agreements with landowners. Additional water demand from these wells could result in local drawdowns of groundwater around the individual wells, reducing their yields. Yields would be expected to return to normal once pumping demands returned to previous amounts. Maintenance requirements on these wells may, however, be accelerated due to above normal use. Spills of

fuels or other hazardous materials during construction could result in contamination of groundwater. This is very unlikely due to the small quantities of such materials that would be on site and the depth to groundwater (several hundred feet to over one thousand feet below ground surface). The exception would be if spills occurred in river valleys where the relatively shallow alluvial aquifer could be affected. Any contamination would not likely be significant due to the limited quantities of materials available to enter the aquifer and its dilution upon entering the groundwater.

Wells used for construction water needs that experience reductions in yield would be expected to return to normal during project operation. In the unlikely event a spill of hazardous materials occurred during train operation in the vicinity of a shallow aquifer or an open well, contamination of the aquifer or well could occur. However, the likelihood of this occurring is considered very unlikely due to the small quantities of hazardous materials potentially released, the few and scattered shallow alluvial aquifers, and wells being located outside the rail line right-of-way.

4.4.8 AIR QUALITY

Construction and operation of the proposed project alternatives would result in changes to the air quality of the project area. While emissions during both construction and operation of the project would generally be consistent with the types of emissions currently present in the project area, increases in emissions would be expected.

Construction related impacts to air quality would generally be localized around the area of construction activity. However, some impacts would likely occur throughout the project area. Local air quality impacts related to construction activity would be short-term and occur at only several isolated, scattered locations at any given time during the two to three year construction period. The primary construction impact to air quality would be the increase in fugitive dust. This increases would occur from a variety of construction activities. Increased traffic from construction workers and equipment on local gravel roads would stir dust from these roadways. Blasting, excavation, and earthmoving activities would also contribute to dust. As noted in Section 4.4.5.3, many of the project area soils are suceptible to wind erosion. Clearing of the right-of-way and earthmoving activities would expose these soils to increased opportunity for wind erosion. Transport of fill material in uncovered trucks could also contribute to fugitive dust. Following completion of construction and reclamation of the right-of-way, these impacts would no longer be expected to continue.

Emissions from construction vehicles and equipment would also impact air quality. These impacts would primarily be confined to the right-of-way where construction activities would be most concentrated. As noted above, the scattered nature of construction would spread equipment emission over a large area. Additionally, emissions would be quickly dispersed by wind, preventing them from becoming concentrated. Vehicle and diesel emissions are common and widespread throughout the project area, although they occur at very low levels. They are particularly prevailent at the various mines throughout the PRB to which this project would connect. Air emissions during construction are not anticipated to reduce air quality in the overall project area due to the temporary and scattered nature of construction activities, construction being confined to the rail line right-of-way and the wind dispersion of emissions.

In-transit loss of coal from railcars during project operation is also expected to occur, potentially increasing fugitive dust along the rail line. However, fugitive dust emissions from these coal losses are intermittent and difficult to quantify. PRB coal has a high moisture content, averaging about 30 percent moisture.[8] The moisture in the coal tends to reduce fugitive dust compared to drier eastern coals that average about 10 percent moisture.[9] Also, the cooler climate of South Dakota and Wyoming tends to cause the coal to freeze together during colder times of the year, further limiting fugitive coal losses during these periods. During the warmer months, rain mixing with the clay in the coal tends to crust the coal pile and significantly reduce fugitive coal emissions during transport.

Some coal losses would be expected during the drier part of the summer months. However, SEA identified no detailed studies that provided information on the amount of coal dust lost from rail transportation or the potential problems it could create. SEA contacted numerous State air quality and pollution control agencies to obtain input on the coal dust-loss issues. SEA contacted the South Dakota Department of Environment and Natural Resources (which also provided information on contacts with the North Dakota and Nebraska Departments of Natural Resources), Wyoming Department of Environmental Quality, Minnesota Pollution Control Agency, Colorado Department of Public Health & Environment, and the Missouri Department of Natural Resources. These states were contacted due to their inclusion in the project area, being known to have rail lines overwhich PRB coal is transported, or both. It was the opinion of these agencies that loss of coal dust does not represent a significant environmental hazard, and that in their experience, loss of coal in the size range to become airborne is an infrequent event. This position is largely based on lack of complaints from persons along the rail

[8] Lick, Robert. 1991. 1991 Keystone Coal Industry Manual. Robert Lick Publisher. Maclean Hunter Publications. Chicago, Illinois. 1991.

[9] Ibid.

routes for coal transportation about coal dust and agencies' field personnel not observing coal dust blowing from open rail cars or settled along the rail lines. Based on this anecdotal evidence, SEA does not believe fugitive coal dust poses a significant environmental concern. However, it does acknowledge that some fugitive coal dust may be noticed along the rail line potentially causing inconvenience to adjacent residents and businesses by requiring periodic washing of buildings, vehicles, and other outside surfaces.

SEA determined that the increases in rail traffic at each analyzed level of operation (20 MNT, 50 MNT, and 100 MNT) would exceed the Board's thresholds, found at 49 CFR 1105.7, for environmental analysis of air quality impacts. These thresholds require SEA to conduct detailed analysis of potential air quality impacts from construction projects that result in an increase of 8 or more trains per day in areas classified as attainment for all criteria pollutants. As all counties in the project area are classified as attainment, this threshold applies to this analysis. Additionally, the Board's regulations require SEA to evaluate potential air quality impacts on other portions of DM&E's rail system where rail traffic would exceed this threshold due to the proposed construction project.

DM&E indicated in its Application that it intends to transport up to 100 MNT of coal per year and that interchanges with other rail carriers are available to route the coal to the users. However, because contracts for coal transportation have not yet been obtained by DM&E, SEA cannot reasonable determine the exact routes overwhich DM&E coal would be transported. Therefore, SEA cannot determine the rail lines which would exceed the Board's thresholds. SEA determined it reasonably for all the increases in rail traffic to occur throughout the existing DM&E system. Thus, SEA performed a system-wide analysis to determine the potential impacts of the proposed project Extension Alternatives on air quality resulting from the operation of unit coal trains that would occur as a result of this project along the entire DM&E rail line. SEA's analysis included proposed emissions increases along the new Extension Alternatives and DM&E's existing rail line across South Dakota and Minnesota. SEA's analysis of air quality impacts along the Extension Alternatives is contained in this Section. Air quality impacts from new rail yards along these alternatives are included at Section 4.9. The results of the air quality analysis for Minnesota are found in Chapter 3, Sections 3.2, and 3.4, and for the existing rail line in South Dakota at Sections 4.3.1 and 4.8.

SEA analyzed emissions (in tons per year) for sulfur dioxide (SO_2), hydrocarbons (HC),[10] particulate matter of less than 10 microns in diameter (PM_{10}), oxides of nitrogen (NO_X), carbon monoxide (CO), and lead (Pb). SEA's analysis was based on the presumption that the demand for PRB coal would increase, with DM&E hauling up to 100 MNT annually and the existing rail carriers hauling future amounts of coal no less than their current levels. Therefore, emissions from DM&E locomotives for this project would represent an increase in the emissions observed for the counties through which the alternatives pass. The project emissions during rail line operation include those from diesel locomotives along the rail lines and within the rail yards. Emissions in the rail yards that would be part of the Extension Alternatives are primarily due to locomotives idling while crews are changed. These emissions are included in Section 4.9.

The emission changes resulting from the proposed project alternatives are given in the following Section on a county-wide basis. The emission calculations and methodology are provided in Appendix E. SEA compared the results of its analysis to the the Environmental Protection Agency's (EPA) major source thresholds for stationary sources. This use of threshold screening levels is consistent with previous SEA studies. EPA's major source thresholds for stationary sources provide the emissions level for each criteria pollutant at which a stationary source of that air pollutant would be required to apply for a major construction or operating permit. No thresholds are currently established for mobile emission sources, such as locomotives. Therefore, SEA used the EPA stationary sources as a reference. If the projected county-wide emissions levels exceeded the air quality screening levels shown in Table 4.4-1, then SEA performed a more detailed air dispersion modeling.

SEA identified eight counties crossed by the Extension Alternatives in South Dakota and Wyoming that meet the STB threshold of eight or more trains per day for air quality analysis. For each county, SEA summed air emissions increases from increases in rail operations and compared them to the air emission screening thresholds shown in Table 4.4-1.

[10] Hydrocarbons are a category of chemical substances containing the elements carbon and hydrogen. A variety of different hydrocarbon compounds are emitted by locomotives. EPA's locomotive emission factors were used to calculate the hydrocarbon emissions resulting from this project. Hydrocarbon emissions are a consideration in this analysis as many of them compose a subgroup of compounds known as volatile organic compounds (VOCs). VOCs can easily combine with other chemicals, including those in the air, to form ozone, one of EPA's criteria pollutants. Generally, one ton of VOC emissions will react to produce one ton of ozone. Therefore, VOC emissions provide a surrogate for potential ozone production. However, EPA's emission factors for locomotives do not include VOC emissions, only hydrocarbons. Therefore, SEA's use of hydrocarbon emissions as a surrogate for VOCs is overly conservative as only the VOC component of hydrocarbons would produce ozone.

Table 4.4-1
County Emissions Screening Levels

Pollutant	Area Designation	Emissions Screening Levels (tons/year)
Nitrogen Oxides (NO_X)	1. Attainment/Maintenance for NO_2 2. Marginal/Moderate ozone 3. Ozone Attainment	100
	Ozone Serious Non-attainment	50
	Ozone Severe Non-attainment	25
Volatile Organic Compounds (VOCs)	1. Attainment/Maintenance for Ozone 2. Marginal/Moderate Ozone Non-attainment	100
	Ozone Serious Non-attainment	50
	Ozone Severe Non-attainment	25
Carbon Monoxide (CO)	1. Attainment/Maintenance for CO 2. Marginal/Moderate Ozone Non-attainment	100
	CO Serious Non-Attainment	50
Particulate Matter less than 10 microns (PM_{10})	1. PM_{10} Attainment or Maintenance 2. PM_{10} Moderate Non-attainment	100
	PM_{10} Serious Non-attainment	70
Sulfur Dioxide (SO_2)	SO_2 Attainment or Non-attainment	100
Lead (Pb)	Pb Attainment or Non-attainment	0.6

A summary of the potential emission increases for each alternative at the 20 million ton level of operation is shown in Tables 4.4-2 through 4.4-4. The 20 million ton level of annual coal transportation was evaluated because DM&E indicated it was the "break even" level for the project. Increases in bold indicate they are greater than EPA's major source threholds for stationary sources provided in Table 4.4-1.

A summary of the potential emission increases for the 50 million tons alternative is shown in Tables 4.4-5 through 4.4-7. The 50 million ton level of coal transportation was evaluated because DM&E indicated this would be approximately the level of operation shortly after project start up. Increases in bold indicate they are greater than EPA's major source threholds for stationary sources provided in Table 4.4-1.

A summary of the potential emission increases for the 100 million tons alternative is shown in Tables 4.4-8 through 4.4-10. The 100 million ton level of operation was evaluated because DM&E indicated this was the maximum level at which its system could operate. Increases in bold indicate they are greater than EPA's major source threholds for stationary sources provided in Table 4.4-1.

Table 4.4-2
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative B - 20 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**131.39**	100	8.21	100	22.05	100	5.55	100	13.80	100	0.0005	0.6
Custer	52.45	100	3.28	100	8.81	100	1.83	100	5.51	100	0.0002	0.6
Fall River	**229.17**	100	14.31	100	38.46	100	9.69	100	24.07	100	0.0008	0.6
Niobrara	80.97	100	5.06	100	13.59	100	3.42	100	8.50	100	0.0003	0.6
Weston	**288.75**	100	18.04	100	48.46	100	12.21	100	30.33	100	0.0010	0.6
Converse	69.26	100	4.33	100	11.62	100	2.93	100	7.27	100	0.0002	0.6
Campbell	**285.70**	100	17.84	100	47.95	100	12.08	100	30.01	100	0.0010	0.6

Gross Ton Increase: 28,967,000.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 254.4

Table 4.4-3
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative C - 20 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**131.39**	100	8.21	100	22.05	100	5.55	100	13.80	100	0.0005	0.6
Custer	62.13	100	3.89	100	10.43	100	2.63	100	6.53	100	0.0002	0.6
Fall River	**242.92**	100	15.18	100	40.77	100	10.27	100	25.52	100	0.0008	0.6
Niobrara	80.97	100	5.06	100	13.59	100	3.42	100	8.50	100	0.0003	0.6
Weston	**201.67**	100	12.60	100	33.84	100	8.52	100	21.18	100	0.0007	0.6
Converse	51.94	100	3.24	100	8.72	100	2.20	100	5.46	100	0.0002	0.6
Campbell	**322.36**	100	20.13	100	54.10	100	13.63	100	33.86	100	0.0011	0.6

Gross Ton Increase: 28,967,000.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 241.7

Table 4.4-4
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative D - 20 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**401.81**	100	25.10	100	67.43	100	16.98	100	42.20	100	0.0014	0.6
Custer	**152.27**	100	9.51	100	25.55	100	6.44	100	15.99	100	0.0005	0.6
Fall River	**356.99**	100	22.30	100	59.91	100	15.09	100	37.49	100	0.0012	0.6
Weston	**453.75**	100	28.34	100	76.15	100	19.18	100	47.66	100	0.0016	0.6
Crook	86.57	100	5.41	100	14.53	100	3.66	100	9.09	100	0.0003	0.6
Campbell	**296.39**	100	18.51	100	49.74	100	12.53	100	31.13	100	0.0010	0.6
Converse	51.94	100	3.24	100	8.72	100	2.20	100	5.46	100	0.0002	0.6

Gross Ton Increase: 28,967,000.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 353.4

Table 4.4-5
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative B - 50 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**312.59**	100	19.53	100	52.46	100	13.22	100	32.83	100	0.0011	0.6
Custer	**124.79**	100	7.80	100	20.95	100	5.28	100	13.10	100	0.0004	0.6
Fall River	**545.21**	100	34.06	100	91.50	100	23.05	100	52.26	100	0.0019	0.6
Niobrara	**192.64**	100	12.03	100	32.33	100	8.14	100	20.23	100	0.0007	0.6
Weston	**686.97**	100	42.91	100	**115.29**	100	29.04	100	72.15	100	0.0024	0.6
Converse	**164.70**	100	10.29	100	27.65	100	6.97	100	17.31	100	0.0006	0.6
Campbell	**679.70**	100	42.45	100	**114.07**	100	28.73	100	71.39	100	0.0023	0.6

Gross Ton Increase: 68,915,700.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 254.4

Table 4.4-6
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative C - 50 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**312.59**	100	19.53	100	52.46	100	13.22	100	32.83	100	0.0011	0.6
Custer	**147.82**	100	9.24	100	24.81	100	6.26	100	15.52	100	0.0005	0.6
Fall River	**577.93**	100	36.10	100	96.99	100	24.43	100	60.70	100	0.0020	0.6
Niobrara	**192.64**	100	12.03	100	32.33	100	8.14	100	20.23	100	0.0007	0.6
Weston	**479.79**	100	29.97	100	80.52	100	20.28	100	50.39	100	0.0016	0.6
Converse	**123.58**	100	7.72	100	20.74	100	5.22	100	12.98	100	0.0004	0.6
Campbell	**766.94**	100	47.90	100	**128.71**	100	32.42	100	80.55	100	0.0026	0.6

Gross Ton Increase: 68,915,700.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 241.7

Table 4.4-7
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative D - 50 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**955.94**	100	59.71	100	**160.43**	100	40.41	100	**100.40**	100	0.0033	0.6
Custer	**362.26**	100	22.63	100	60.80	100	15.31	100	38.05	100	0.0012	0.6
Fall River	**849.32**	100	53.05	100	**142.54**	100	35.90	100	89.20	100	0.0029	0.6
Weston	**1079.52**	100	67.43	100	**181.17**	100	45.63	100	**113.38**	100	0.0037	0.6
Crook	**205.97**	100	12.87	100	34.57	100	8.71	100	21.63	100	0.0007	0.6
Campbell	**705.14**	100	44.04	100	**118.34**	100	29.81	100	74.06	100	0.0024	0.6
Converse	**123.58**	100	7.72	100	20.74	100	5.22	100	12.98	100	0.0004	0.6

Gross Ton Increase: 68,915,700.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 353.4

Table 4.4-8
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative B - 100 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**610.25**	100	38.11	100	**102.41**	100	25.79	100	64.09	100	0.0021	0.6
Custer	**234.62**	100	15.21	100	40.88	100	10.29	100	25.58	100	0.0008	0.6
Fall River	**1064.38**	100	**66.48**	100	**178.62**	100	44.99	100	**111.79**	100	0.0037	0.6
Niobrara	**376.08**	100	23.49	100	63.12	100	15.90	100	39.50	100	0.0013	0.6
Weston	**1341.13**	100	83.77	100	**225.07**	100	56.69	100	**140.85**	100	0.0046	0.6
Converse	**321.68**	100	20.09	100	53.99	100	13.60	100	33.79	100	0.0011	0.6
Campbell	**1326.94**	100	82.88	100	**222.69**	100	56.09	100	**139.36**	100	0.0046	0.6

Gross Ton Increase: 4,539,615.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 254.4

Table 4.4-9
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative C - 100 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**610.25**	100	38.11	100	**102.41**	100	25.79	100	64.09	100	0.0037	0.6
Custer	**288.57**	100	18.02	100	48.43	100	12.19	100	25.83	100	0.0032	0.6
Fall River	**1128.25**	100	70.47	100	**189.34**	100	47.69	100	**118.49**	100	0.0054	0.6
Niobrara	**376.08**	100	23.49	100	63.12	100	15.90	100	39.50	100	0.0013	0.6
Weston	**936.66**	100	58.50	100	**157.19**	100	39.59	100	98.37	100	0.0032	0.6
Converse	**241.26**	100	15.07	100	40.49	100	10.20	100	25.34	100	0.0008	0.6
Campbell	**1497.24**	100	93.52	100	**251.27**	100	63.29	100	**157.25**	100	0.0051	0.6

Gross Ton Increase: 134,539,615.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 241.7

Table 4.4-10
Comparison of Emission Increases - South Dakota and Wyoming to EPA Thresholds for Alternative D - 100 million net tons/year

County	NO_X		HC		CO		PM_{10}		SO_2		Pb	
	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold	Increase	Threshold
Pennington	**1866.22**	100	**116.57**	100	**313.20**	100	78.89	100	**196.00**	100	0.0064	0.6
Custer	**707.23**	100	44.17	100	**118.69**	100	29.90	100	74.28	100	0.0024	0.6
Fall River	**1658.08**	100	**103.56**	100	**278.26**	100	70.09	100	**174.14**	100	0.0057	0.6
Weston	**2107.49**	100	131.63	100	**353.69**	100	89.09	100	**221.34**	100	0.0072	0.6
Crook	**402.10**	100	25.12	100	67.48	100	17.00	100	42.23	100	0.0013	0.6
Campbell	**1376.61**	100	**85.98**	100	**231.03**	100	58.19	100	**144.58**	100	0.0047	0.6
Converse	**241.26**	100	15.07	100	40.49	100	10.20	100	25.34	100	0.0008	0.6

Gross Ton Increase: 134,539,615.00
Fuel Efficiency Factor (ton miles per gallon): 993.80
Total length of Segments (miles): 353.4

For the 20 and 50 million ton per year options, SEA prediced NO_x, CO and SO_2 emissions would exceed the major source thresholds in several counties. For the 100 million ton per year option, SEA predicted NO_x, CO, SO_2, and also HC emissions would exceed the major source thresholds in several counties. Therefore, the results of the CALPUFF air dispersion modeling were reviewed to determine if the impacts from the new rail traffic would be expected to exceed the National Ambient Air Quality Standards (NAAQS) or the Prevention of Significant Deterioration (PSD) increments. The NAAQS are an air quality standard established by EPA for the protection of human health and welfare. They provide the maximum allowable concentrations for a pollutant in a particular county, and take into consideration emissions inside and outside the county that could affect the county. The NAAQS for the various pollutants are:

- NO_x - 100 micrograms/cubic meter (annual average),
- CO - 40,000 micrograms/cubic meter (1 hour average),
- CO - 10,000 micrograms/cubic meter (8 hour average),
- SO_2 - 80 microgram/cubic meter (annual average),
- SO_2 - 365 micrograms/cubic meter (24 hour average)
- SO_2 - 1,300 micrograms/cubic meter (3 hour average - secondary standard),
- PM_{10} - 50 micrograms/cubic meter (annual average),
- PM_{10} - 150 micrograms/cubic meter (24 hour average).

PSD increments are established by EPA. PSD standards have been established which serve to keep areas which have very good air quality from being degraded to NAAQS by allowing only certain increments (increases) above existing background air quality conditions. PSD allowable increments are not the same for all areas of the country. For purposes of allowable increases, areas of the county have been designated as either Class I or Class II.

A Class I airshed is an area designated by Congress as having "special national or regional value from a natural, scenic, recreational, or historical perspective." Examples of Class I areas include national parks and wilderness areas larger than 5,000 acres and other areas designated by the states or Tribes. Class I areas are designed to have the best air quality and, therefore, have the smallest allowable increments. Designation as a PSD Class I (Class I) area affords the area an increased level of protection for its air quality. PSD Class I increments are more stringent than Class II increment and are:

- NO_x - 2.5 micrograms/cubic meter (annual average)
- SO_2 - 2 micrograms/cubic meter (annual average)
- SO_2 - 5 micrograms/cubic meter (24 hour average)
- SO_2 - 25 micrograms/cubic meter (3 hour average)

· PM_{10} - 4 micrograms/cubic meter (annual average)
· PM_{10} - 8 micrograms/cubic meter (24 hour average)

The Class I airsheds of concern for this project include Badlands National Park/Sage Creek Wilderness area and Wind Cave National Park.

Class II areas have larger allowable increases. Class II increments have been identified for NO_X, SO_2, and PM_{10} and are:

· NO_x - 25 microgram/cubic meter (annual average),
· SO_2 - 20 micrograms/cubic meter (annual average),
· SO_2 - 91 micrograms/cubic meter (24 hour average),
· SO_2 - 512 micrograms/cubic meter (3 hour average),
· PM_{10} - 17 micrograms/cubic meter (annual average),
· PM_{10} - 30 micrograms/cubic meter (24 hour average).

All the alternatives would be constructed through PSD Class II areas. However, air pollutants disperse from sources (such as locomotive engines) and can affect air quality many miles away from the emission's source. Concerns have been raised about the potential for pollutants generated by the locomotives to affect nearby Class I areas where the increment is lower. They are the amount emissions of a particular pollutant can be increased above the existing emission level for that pollutant in a particular county. However, they do not enable emissions for a particular pollutant to exceed the NAAQS standards. For example, the NAAQS for NO_x is 100 microgram/cubic meter. If the existing NO_x level is 25 microgram/cubic meter, a new emissions source would have 75 microgram/cubic meter of emissions before it would reach the NAAQS level. However, PSD Class II increments would only allow the emissions to increase by 25 microgram/cubic meter. Should the existing emissions be 80 microgram/cubic meter for NO_X, while PSD Class II increments would allow it to be increased by 25 microgram/cubic meter, NAAQS standards would only allow an increase of 20 microgram/cubic meter.

SEA used the CALPUFF model to determine potential visibility impacts to Class I airsheds as discussed below. SEA also used the results of the CALPUFF model to determine screening-level ambient air quality impacts near the rail line alternatives ("near-field" impacts) for comparison to the National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) Class II increments. The PSD Class II increments are the amounts of emissions increases above which a source is considered to "significantly deteriorate" the air quality of a particular area. SEA performed this analysis to determine if the emissions increases from the proposed alternatives could cause or contribute to a violation of the applicable state and Federal ambient air quality standards or PSD Class II increments. SEA's analysis

showed that maximum projected ambient concentrations would be significantly lower than the ambient air quality standards or Class II increments. That is, emissions from the railroad are not expected to cause or contribute to a violation of the applicable state or Federal ambient air quality standards. The modeling methodology is described in Appendix E (reference *Attachment 1: CALPUFF Technical Support Document*).

Recent studies by the BLM on projects within the PRB, including the Wyodak Coal Bed Methane Environmental Impact Statement and Horse Creek Coal Lease Environmental Impact Statement, indicated concern for visibility at Class I airsheds due to emissions in the PRB region.

The Class I airsheds of concern for this project include Badlands National Park/Sage Creek Wilderness area and Wind Cave National Park. The BLM studies indicated emissions throughout the PRB, including those from locomotives hauling the region's coal, were contributing to reduced air quality in the form of reduced visibility at these Class I areas. Based on the BLM's findings and concerns expressed by the National Parks Service (NPS) and USFS, SEA conducted a dispersion modeling analysis for the PRB and these Class I areas to determine the potential impacts of the proposed alternatives on the visibility at these areas. SEA used the CALPUFF model to evaluate the effects of total DM&E locomotive emission, including emissions along the proposed alternatives and at rail yards, on these Class I areas due to operation of the proposed alternatives. SEA modeled each of the Extension Alternatives at the 20 MNT, 50 MNT, and 100 MNT operation scenarios.

Three Class I areas, Badlands National Park, Wind Cave National Park and the Sage Creek Wilderness Area (within Badlands National Park), exist in relatively close proximity to the alternatives. Both Class I areas are located in South Dakota. Alternative D would be constructed less than 3 miles east of Wind Cave National Park in Custer County. The Sage Creek Wilderness Area is located approximately 6.2 miles south of Alternatives B and C west of Wall in Pennington County.

Since 1987, EPA has supported the Interagency Monitoring of Protected Visual Environments (IMPROVE) network in cooperation with the NPS, Forest Service, BLM, USFWS, and state agencies. One of the principal purposes of the IMPROVE network is to gather data that can be used to identify sources of impairment on an individual site, regional and national scale. This network began with 20 long-term monitoring sites in 1987 and now includes over 40 sites in parks and wilderness areas across the nation. There is an IMPROVE monitoring site in Badlands National Park. The Badlands IMPROVE monitoring site ranks in the middle of the range from cleanest to dirtiest monitoring sites in the nation (ranked 22 out of 42 total sites). The visibility degradation, like may rural western areas, is largely due to sulfate, organic and soot

aerosols. Visibility at the Badlands National Park IMPROVE site is generally considered to be only average.

Recent studies by the BLM on projects within the PRB, including the Wyodak Coal Bed Methane Environmental Impact Statement and Horse Creek Coal Lease Environmental Impact Statement, indicated concern for visibility at Class I airsheds due to emissions in the PRB region. The Class I airsheds of concern for this project include Badlands National Park/Sage Creek Wilderness area and Wind Cave National Park. The BLM studies indicated emissions throughout the PRB, including those from locomotives hauling the region's coal, were contributing to reduced air quality in the form of reduced visibility at these Class I areas. Based on the BLM's findings and concerns expressed by the National Parks Service (NPS) and USFS, SEA conducted a dispersion modeling analysis for the PRB and these Class I areas to determine the potential impacts of the proposed alternatives on the visibility at these areas. SEA used the CALPUFF model to evaluate the effects of total DM&E locomotive emission, including emissions along the proposed alternatives and at rail yards, on these Class I areas due to operation of the proposed alternatives. SEA modeled each of the Extension Alternatives at the 20 MNT, 50 MNT, and 100 MNT operation scenarios.

Visibility impairment is generally referred to in units of deciview (dv) or percent extinction. The dv scale is similar to the decibel scale for noise in that zero deciview represents clean air or zero impairment as zero decibels represents no noise. As dv measurements increase above zero, they indicate reduced, or more impaired, visibility. These units measure the distance a person can see a landscape feature and the amount of contrast, detail, and color that is perceived. As humidity, cloud cover, weather, or air polllution levels change, so do the components of visibility (detail, constrast, color) perceived by the viewer. Simply stated, the less light able to pass through the atmosphere, the less visible an object on the landscape. Therefore, because humidity, cloud cover, and pollution absorb or reflect light, the greater their levels, the lower the visibility. This reduction in light due to reflection or absorption is referred to as extinction. The greater the atmospheric light extinction, the lower the visibility. In terms of perception, the human eye can normally perceive changes in visibility, under a range of circumstances, measured as greater than 1.0 dv. This corresponds to greater than 10 percent extinction of atmospheric light. While normally unnoticable to the human eye, a 0.5 dv, or 5 percent light extinction, level is considered by the NPS and USFS as a level of impairment to consider when evaluating a project's potential impacts to air quality. The 0.5 dv level provides a level of impairment above which reductions in visibility can potentially become noticable. Therefore, it is a useful level to evaluate the potential for adverse visibility impairment. Additionally, these agencies may consider visibility impairment above 0.5 dv due to air pollution to be unnatural and therefore consider them adverse affects.

The results of SEA's visibility modeling are provided in Tables 4.4-11 to 4.4-13. Based on the modeling, Class I airsheds (Badlands National Park, Sage Creek Wilderness Area, and Wind Cave National Park) would not experience any visual impairment at the 20 MNT level due to Alternative C. However, all of the alternatives would impair visibility at Class I airsheds under the 50 MNT and 100 MNT levels. Table 4.4-14 to 4.4-16 provides the months and number of days in each month that visual impairment would occur to the Class I airsheds as a result of each Extension Alternative. SEA correlated the months when impairment to Class I airsheds would occur with monthly visitor use information to evaluate the potential significance of visual impairment. Table 4.4-17 provides monthly visitor use information for these areas. SEA noticed that the days modeled to have impaired visibility generally occurred during the low-use winter and early spring months. Only a small percentage of the visitors to these areas would be expected to experience reduced visibility as a result of any of the Extension Alternatives, even at the 100 MNT level. Those few visitors unfortunate enough to visit one of these areas on an impaired day could experience what they perceive as significant reductions in visibility. This perception would largely be based on the individual. In particular, if they had visited the area before and not experienced impaired visibility they would be more aware of reduced visibility. However, if the visitor had not previously visited the area, they would be unfamiliar with the landscape and may not recognize that their view was impaired. While overall significance is difficult to determine, it appears that each alternative would have adverse impacts to visibility at the 50 MNT and 100 MNT operating levels due to the number of days having 0.5 dv or greater impairment.

Table 4.4-11
Days of Visibility Impairment At Sensitive Visual Areas for Extension Alternatives at 20 MNT

AREA	DM&E Project						Cumulative					
	Extinction/Impairment (Percent)						Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10			Greater than 5			Greater than 10		
	B	C	D	B	C	D	B	C	D	B	C	D
Badlands NP	0	0	1	0	0	0	40	39	45	14	13	14
Blackelk WA	0	0	0	0	0	0	66	66	68	25	25	25
Mt. Rushmore	0	0	0	0	0	0	59	59	63	22	22	22
Wind Cave NP	0	0	0	0	0	0	78	78	79	25	25	27
Jewel Cave NP	0	0	0	0	0	0	92	93	92	40	40	40
Devil's Tower	0	0	0	0	0	0	143	143	144	70	70	70

Table 4.4-11
Days of Visibility Impairment At Sensitive Visual Areas for Extension Alternatives at 20 MNT

AREA	DM&E Project						Cumulative					
	Extinction/Impairment (Percent)						Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10			Greater than 5			Greater than 10		
	B	C	D	B	C	D	B	C	D	B	C	D
North Cheyenne	0	0	0	0	0	0	38	38	38	24	24	24
Cloud Peak WA	0	0	0	0	0	0	33	33	33	17	17	17

Table 4.4-12
Days of Visibility Impairment At Sensitive Visual Areas for Extension Alternatives at 50 MNT

AREA	DM&E Project						Cumulative					
	Extinction/Impairment (Percent)						Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10			Greater than 5			Greater than 10		
	B	C	D	B	C	D	B	C	D	B	C	D
Badlands NP	1	0	10	0	0	1	51	52	58	15	15	17
Blackelk WA	0	0	3	0	0	0	72	73	75	28	28	28
Mt. Rushmore	0	0	3	0	0	0	65	65	70	23	23	23
Wind Cave NP	1	1	2	0	0	0	79	79	82	29	28	29
Jewel Cave NP	0	0	2	0	0	0	96	96	98	40	40	41
Devil's Tower	1	1	1	0	0	0	144	144	146	70	71	71
North Cheyenne	2	2	3	0	0	0	39	39	40	24	24	24
Cloud Peak WA	0	0	0	0	0	0	33	33	34	19	19	20

Table 4.4-13
Days of Visibility Impairment At Sensitive Visual Areas for Extension Alternatives at 100 MNT

AREA	DM&E Project						Cumulative					
	Extinction/Impairment (Percent)						Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10			Greater than 5			Greater than 10		
	B	C	D	B	C	D	B	C	D	B	C	D
Badlands NP	12	9	31	1	0	7	60	57	82	21	22	33
Blackelk WA	5	3	9	0	0	3	77	78	85	29	30	33
Mt. Rushmore	4	3	7	0	0	3	74	74	80	26	28	30
Wind Cave NP	3	3	12	1	1	2	84	84	92	30	32	34
Jewel Cave NP	5	4	8	0	0	1	99	99	105	41	41	44
Devil's Tower	3	4	5	1	1	1	147	146	150	72	72	74
North Cheyenne	4	4	6	2	2	3	40	40	41	24	24	24
Cloud Peak WA	0	1	1	0	0	0	35	35	35	20	20	20

Table 4.4-14
Days of Visibility Impairment At Sensitive Visual Areas for Extension Alternatives at 20 MNT

AREA	DM&E Project					
	Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10		
	B	C	D	B	C	D
Badlands NP	0	0	1 - January	0	0	0

Table 4.4-15
Days of Visibility Impairment By Month
At Sensitive Visual Areas for Extension Alternatives at 50 MNT

AREA	DM&E Project					
	Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10		
	B	C	D	B	C	D
Badlands NP	1 - March	0	2 - January 1 - March 1 - April 1 - May 1 - June 1 - August 1 - November 1 - December	0	0	1 - January
Blackelk WA	0	0	2 - April 1 - May	0	0	0
Mt. Rushmore	0	0	2 - April 1 - May	0	0	0
Wind Cave NP	1- April	1 - April	2 - April	0	0	0
Jewel Cave NP	0	0	2 - April	0	0	0
Devil's Tower	1 - February	1 - February	1 - February	0	0	0

Table 4.4-15
Days of Visibility Impairment By Month
At Sensitive Visual Areas for Extension Alternatives at 50 MNT

AREA	DM&E Project					
	Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10		
	B	C	D	B	C	D
North Cheyenne	2 - February	2 - February	1 - January 2 - February	0	0	0

Table 4.4-16
Days of Visibility Impairment At Sensitive Visual Areas for Extension Alternatives at 100 MNT

AREA	DM&E Project					
	Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10		
	B	C	D	B	C	D
Badlands NP	2 - January 1 - February 2 - April 1 - May 1- November 4 - December	1- February 1 - March 2 - April 1 - November 4 - December	4 - January 4 - February 1 - March 2 - April 3 - May 1 - June 1 - August 2 - September 6 - December	1 - March	0	2 -January 1- March 1 - April 1 - May 1 - November 1- December
Blackelk WA	1 - February 1 - March 2 - April 1 - May	1 - February 1 - March 1 - April	1 - January 3 - February 2 - March	0	0	2- April 1 - May
Mt. Rushmore	1 - February 2 - April 1- May	1 - February 1 - March 1 - April	1 - January 2 - February 1 - March	0	0	2 - April 1 - May

Table 4.4-16
Days of Visibility Impairment At Sensitive Visual Areas for Extension Alternatives at 100 MNT

AREA	DM&E Project					
	Extinction/Impairment (Percent)					
	Greater than 5			Greater than 10		
	B	C	D	B	C	D
Wind Cave NP	1 - March 1 - April	1 - February 1 - March	1 - January 2 - February 2 - March 2 - May 1 - June 1 - September 1 - December	1 - April	1 - April	2- April
Jewel Cave NP	1 - January 1 - February 1 - March 2 - April	1 - January 1 - February 1 - March 1 - April	1 - January 3 -February 1 - March 1 - April 1 - May	0	0	1 - April
Devil's Tower	1 - January 1 - February	1 - January 1 - February 1 - March	1 - January 2 - February 1 - March	1- February	1 - February	1 - February
North Cheyenne	1- January 1- March	1 - January 1 - March	1 - February 1 - March 1 - May	2 - February	2 - February	1 - January 2 - February
Cloud Peak WA	0	1 - January	1 - January	0	0	0

South Dakota and Wyoming do not currently regulate emissions from locomotives. However, the 1990 Clean Air Act amendments included a specific mandate for EPA to regulate locomotive emissions. According to the EPA (1997), unregulated locomotives are estimated to contribute almost 5 percent of the total nationwide emissions of NO_X, which is more than 10 percent of the nationwide mobile sources of NO_X emissions.

EPA has developed emission standards for NO_X, hydrocarbons, carbon monoxide, particulate matter, and smoke for newly manufactured and remanufactured diesel-powered locomotives and locomotive engines. EPA (1997) predicts that these new standards, which took effect in 2000, will achieve approximately a 66 percent reduction in NO_X emissions. Hydrocarbon and particulate matter will be reduced by about 50 percent.

SEA also looked at vehicle delays to determine if emissions from vehicles waiting for a passing train would potentially reduce air quality. However, none of the grade crossings of roadways for any of the Extension Alternatives would be of roadways with ADTs equal to or greater than 5,000 vehicles per day. Most of the roadways crossed have ADTs of less than 500 vehicles per day. SEA concluded that the low levels of vehicle traffic on roadways that would be crossed by the proposed project would result in few vehicles being delayed per train crossing event. Therefore, no impacts to air quality would result from idling vehicles delayed at grade crossings.

Table 4.4-17
Number of Recreation Visits at National Parks Per Month in 1998

Month	Badlands National Park	Mount Rushmore National Memorial	Wind Cave National Park	Devils Tower National Monument	Jewel Cave National Monument	Cloud Peak Wilderness Area	Black Elk Wilderness Area
January	6,490	13,964	14,994	2,228	252	No Monthly Statistics Available	No Statistics Available
February	5,369	17,858	16,629	2,384	301		
March	6,629	23,760	26,145	3,642	886		
April	19,097	42,802	31,284	8,149	1,740		
May	72,123	143,202	103,949	28,083	5,278		
June	214,871	365,486	123,336	77,524	24,621		
July	243,051	570,456	195,530	106,847	44,414		
August	253,556	467,944	186,315	105,850	35,022		
September	125,014	262,449	78,266	44,929	13,860		
October	57,885	71,557	37,298	13,237	3,524		
November	11,298	18,135	20,289	4,023	684		
December	5,666	16,872	15,939	2,168	476		
TOTAL	1,021,049	2,014,485	849,974	399,064	131,058	60,000-70,000	

4.4.9 NOISE and VIBRATION

4.4.9.1 Noise

The construction and operation of the proposed project would result in the generation of noise. During construction, temporary noise would be generated from operation of construction vehicles and heavy equipment. These impacts would occur only during the period required to construct the rail line in a particular area. Construction of culverts and bridges would take from a day or two up to a few weeks. Following installation of culverts and bridges, the rail bed would be prepared. Rail bed preparation could occur concurrently or immediately following culvert and bridge construction or could occur some time afterward. Once the rail bed is prepared, taking from several days to several weeks per mile depending on cut or fill requirements, ballast, track, and ties would be installed at approximately one mile per day. Once completed, another section of rail line would be constructed. In this way, impacts from construction noise would be moved along the rail line, with actual noise impacts occurring to adjacent areas and along limited portions of the rail line at any given time.

Although construction activities and associated noise would be temporary, only occurring until construction was completed, they could occur around the clock in order to complete construction activities as quickly as possible. Normally, construction would be expected to occur in two shifts, from approximately 6 a.m. to 11 p.m., with equipment maintenance occurring between 11 p.m. and 6 a.m. Impacts from construction noise would be similar to those described in Section 4.3.9 and would include disturbance to residences near the rail line. However, the rural nature of much of the project area limits the total number of noise sensitive receptors that would experience a noise increase during construction.

The SEA determined that the new build portion of the proposed project would meet the Board's environmental analysis thresholds for noise set forth at 49 CFR 1105.7(e)(6). The Board's thresholds for noise analysis are:

- all rail lines where rail traffic would increase by eight or more trains per day, or
- all rail lines for which the gross ton-miles transported annually increases by 100 percent or more.

Based on information provided in DM&E's Application to the Board, indicating a monetary break-even level of rail traffic equal to 8 trains per day increasing over time to as many as 34 trains per day, SEA determined detailed analysis of noise impacts was appropriate for the

Extension Alternatives. Therefore, SEA conducted a detailed evaluation of potential noise impacts from operation of the proposed project.

SEA performed an analysis of the entire length of each of the Extension Alternatives to determine the potential noise impacts of the proposed increases in rail traffic. Figure 4.1-1 provides a comparison of common noise sources to locomotive wayside and horn noise. Based on these levels of noise, SEA calculated the distance (contour) at which the average daily noise level (L_{dn}) would be equal to 65 decibels (dB) on an A-weighted scale (A),[11] or would experience an increase of 3 dBA L_{dn} or greater, as specified in the Board's rules. Distances less than the 65 dBA L_{dn} contour would experience average daily noise levels greater than 65 dBA L_{dn}. Federal agencies, including the Federal Aviation Administration and Department of Housing and Urban Development, consider noise levels up to 65 dBA L_{dn} to be compatible with most noise sensitive receptors. These agencies, as well as the Board, agree that noise levels at or above 65 dBA L_{dn} are adverse. SEA also calculated the 70 dBA L_{dn} contour. The 70 dBA L_{dn} noise level was established by SEA in the Conrail Acquisition, Finance Docket No.33388, as the noise level at and above which mitigation for noise impacts would be considered for that case. It is applied here as a comparison to the number of noise sensitive receptors calculated to experience noise levels of 65 dBA L_{dn} or greater. Additionally, SEA considers noise levels at and above 70 dBA L_{dn} to be significantly adverse.

Noise contours were calculated for both the existing and proposed operating conditions, at proposed coal transportation levels of 20 MNT, 50 MNT, and 100 MNT. These levels of operation were selected because exact levels of train traffic are dependent upon DM&E negotiating contracts for coal transportation. The 20 MNT level is roughly the break-even level for the project and therefore represents the minimum level of rail traffic. DM&E projected in its Application to the Board a level equivalent to 50 MNT shortly after beginning operation, potentially expanding to a maximum of 100 MNT within 7 years. As 50 MNT appears to be a reasonably foreseeable level of operation and 100 MNT was indicated as the maximum level DM&E's system could accomodate, these levels of operation were also evaluated. Contours were calculated for 8 (20 MNT), 18 (50 MNT), and 34 (100 MNT) coal trains per day and considered existing DM&E traffic, as applicable. SEA counted noise sensitive receptors (eg. schools, hospitals, churches, and residences) within the noise contours for the current condition and under each of the proposed operating scenarios.

Noise sources from rail operations include diesel locomotive engine and exhaust noise, wheel/rail interaction noise (or wayside noise), and horn noise. Wayside noise affects all locations in the vicinity of the rail facility. Horn noise is an additional noise source at and in the vicinity of

[11] A-weighted scale considers only those frequencies of noise that are audible to the human ear.

grade crossings where trains are required by law to sound a horn for safety. Both types of noise diminish with distance.

The areas along DM&E's existing rail line and the communities that would experience increases in rail traffic or activity meeting the Board's environmental analysis threshold for South Dakota and Wyoming are listed in Tables 4.4-11 through 4.4-30. Tables 4.4-11 through 4.4-20 show the communities, within their respective counties, with the number of noise sensitive receptors expected to experience noise levels exceeding 65 dBA L_{dn} for each community and the county. County totals are in bold and include both the sensitive receptors within and outside the communities. Noise sensitive receptors within this noise level due to wayside noise, wayside and horn noise, and horn noise only are presented. Tables 4.4-21 through 4.4-30 show the communities, within their respective counties, with the number of noise sensitive receptors exceeding 70 dBA L_{dn}.

Table 4.4-18
Alternative B
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**1**	**0**	**0**	**1**
Custer	**0**	**0**	**2**	**2**
Fall River	**0**	**1**	**21**	**22**
Smithwick	0	0	3	3
Heppner	0	0	0	0
Edgemont	0	0	14	14
Marietta	0	1	0	1
Niobrara	**0**	**0**	**0**	**0**
Weston	**0**	**0**	**0**	**0**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-19
Alternative C
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**1**	**0**	**0**	**1**
Custer	**0**	**0**	**0**	**0**
Fall River	**1**	**0**	**8**	**9**
Smithwick	0	0	4	4
Heppner	0	0	1	1
Dudley	0	1	2	3
Marietta	0	1	0	1
Niobrara	**0**	**0**	**0**	**0**
Weston	**0**	**0**	**0**	**0**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-20
Alternative D
Number of Existing Noise Sensitive Receptors - 65 dBA L_{dn}

County and Community	Wayside	Wayside/Horn	Horn	Total
Pennington	**0**	2	**188**	**190**
Wasta	0	2	14	16
Owanka	0	0	3	3
New Underwood	0	0	10	10
Box Elder	0	0	19	19
Rapid City	0	0	142*	142*
Ajax	0	0	0	0
Custer	**0**	**0**	**0**	**0**
Hermosa	0	0	0	0
Fairburn	0	0	0	0
Buffalo Gap	0	0	0	0

Table 4.4-20
Alternative D
Number of Existing Noise Sensitive Receptors - 65 dBA L_{dn}

County and Community	Wayside	Wayside/Horn	Horn	Total
Fall River	**0**	**0**	**0**	**0**
Oral	0	0	0	0
Smithwick	0	0	0	0
Dudley	0	0	0	0
Marietta	0	0	0	0
Weston	**1**	**0**	**0**	**0**
Burdock	0	0	0	0
Dewey	0	0	0	0
Clifton	0	0	0	0
Owens	1	0	0	0
Newcastle	0	0	0	0
Osage	0	0	0	0
Clay Spur	0	0	0	0
Upton	0	0	0	0
Colloid	0	0	0	0
Bentley	0	0	0	0
Crook	**0**	**0**	**0**	**0**
Moorcroft	0	0	0	0
Campbell	**0**	**0**	**0**	**0**
Rozet	0	0	0	0

Table 4.4-21
Alternative D
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**4**	**143**	**851**	**998**
Wasta	0	12	42	54
Owanka	0	3	6	9
New Underwood	0	9	55	64
Box Elder	0	11	131	142
Rapid City	0	108*	615*	723*
Ajax	0	0	1	1
Custer	**0**	**6**	**61**	**67**
Hermosa	0	1	17	18
Fairburn	0	1	12	13
Buffalo Gap	0	4	30	34
Fall River	**0**	**7**	**37**	**44**
Oral	0	4	21	25
Smithwick	0	0	11	11
Dudley	0	1	2	3
Marietta	0	1	0	1
Weston	**8**	**52**	**344**	**404**
Burdock	0	1	2	3
Dewey	0	2	10	12
Clifton	0	0	1	1
Owens	0	0	1	1
Newcastle	7	45	244	296
Osage	0	1	26	27
Clay Spur	0	0	1	1
Upton	0	0	45	45
Colloid	0	0	0	0
Bentley	0	1	1	2
Crook	**0**	**19**	**72**	**91**
Moorcroft	0	19	72	91
Campbell	**0**	**3**	**10**	**13**
Rozet	0	0	7	7

Table 4.4-22
Alternative B
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**2**	**0**	**0**	**2**
Custer	**0**	**0**	**3**	**3**
Fall River	**1**	**2**	**39**	**42**
Smithwick	0	0	7	7
Heppner	0	1	0	1
Edgemont	0	0	27	27
Marietta	0	1	0	1
Niobrara	**0**	**0**	**0**	**0**
Weston	**0**	**0**	**1**	**1**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-23
Alternative C
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**2**	**0**	**0**	**2**
Custer	**0**	**0**	**0**	**0**
Fall River	**0**	**4**	**12**	**16**
Smithwick	0	0	8	8
Heppner	0	0	1	1
Dudley	0	2	1	3
Marietta	0	1	0	1

Table 4.4-23
Alternative C
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Niobrara	**0**	**0**	**2**	**2**
Weston	**0**	**0**	**1**	**1**
Darlington	0	0	1	1
Campbell	**0**	**0**	**0**	**0**
Converse	**0**	**0**	**0**	**0**

Table 4.4-24
Alternative D
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**11**	**231**	**1,425**	**1,667**
Wasta	0	17	43	60
Owanka	0	3	12	15
New Underwood	0	11	112	123
Box Elder	0	17	151	168
Rapid City	0	183*	1,105	1,288
Ajax	0	0	1	1
Custer	**0**	**15**	**123**	**138**
Hermosa	0	4	38	42
Fairburn	0	2	19	21
Buffalo Gap	0	9	60	69
Fall River	**0**	**15**	**39**	**54**
Oral	0	7	23	30
Smithwick	0	4	12	16
Dudley	0	2	1	3
Marietta	0	1	0	1

Table 4.4-24
Alternative D
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 trains			
	Wayside	Wayside/Horn	Horn	Total
Weston	**17**	**74**	**469**	**560**
Burdock	0	1	2	3
Dewey	0	2	11	13
Clifton	0	0	1	1
Owens	0	1	0	1
Newcastle	16	57	330	403
Osage	0	5	52	57
Clay Spur	0	0	1	1
Upton	0	2	54	56
Colloid	0	0	0	0
Bentley	0	1	1	2
Crook	**0**	**22**	**128**	**150**
Moorcroft	0	22	127	149
Campbell	**1**	**3**	**12**	**16**
Rozet	0	0	8	8

Table 4.4-25
Alternative B
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**2**	**0**	**0**	**2**
Custer	**0**	**0**	**3**	**3**
Fall River	**2**	**9**	**53**	**64**
Smithwick	1	2	8	11
Heppner	0	1	0	1
Edgemont/Dudley	0	3	43	46
Marietta	0	1	0	1

Table 4.4-25
Alternative B
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Weston	**0**	**0**	**2**	**2**
Campbell	**1**	**1**	**0**	**2**
Converse	**0**	**0**	**0**	**0**

Table 4.4-26
Alternative C
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**2**	**0**	**0**	**2**
Custer	**1**	**0**	**0**	**1**
Fall River	**1**	**6**	**14**	**21**
Smithwick	0	2	7	9
Heppner	0	0	1	1
Dudley	0	2	1	3
Marietta	1	0	1	2
Niobrara	**0**	**0**	**0**	**0**
Weston	**0**	**0**	**1**	**1**
Darlington	0	0	1	1
Campbell	**3**	**1**	**1**	**5**
Converse	**0**	**0**	**0**	**0**

Table 4.4-27
Alternative D
Number of Noise Sensitive Receptors - 65 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**14**	**388**	**1,858**	**2,260**
Wasta	0	24	36	60
Owanka	0	5	12	17
New Underwood	0	20	116	136
Box Elder	0	27	159	186
Rapid City	0	312	1,534	1,846
Ajax	0	0	1	1
Custer	**0**	**23**	**133**	**156**
Hermosa	0	5	45	50
Fairburn	0	4	21	25
Buffalo Gap	0	14	58	72
Fall River	**0**	**28**	**34**	**62**
Oral	0	17	16	33
Smithwick	0	6	10	16
Dudley	0	2	2	4
Marietta	0	1	0	1
Weston	**55**	**126**	**621**	**802**
Burdock	0	2	1	3
Dewey	0	7	6	13
Clifton	0	0	2	2
Owens	0	1	0	1
Newcastle	53	79	421	553
Osage	0	12	70	82
Clay Spur	0	0	1	1
Upton	0	17	103	120
Colloid	0	0	0	0
Bentley	0	1	1	2
Crook	**0**	**57**	**117**	**174**
Moorcroft	0	57	115	172
Campbell	**6**	**4**	**12**	**22**
Rozet	0	0	8	8

Table 4.4-28
Alternative B
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**0**	**0**	**0**	**0**
Custer	**0**	**0**	**0**	**0**
Fall River	**0**	**1**	**11**	**12**
Smithwick	0	0	2	2
Heppner	0	1	0	1
Edgemont	0	0	4	4
Marietta	0	0	1	1
Niobrara	**0**	**0**	**0**	**0**
Weston	**0**	**0**	**0**	**0**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-29
Alternative C
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**0**	**0**	**0**	**0**
Custer	**0**	**0**	**1**	**1**
Fall River	**0**	**0**	**5**	**5**
Smithwick	0	0	2	2
Heppner	0	0	0	0
Dudley	0	0	2	2
Marietta	0	0	1	1
Niobrara	**0**	**0**	**0**	**0**

Table 4.4-29
Alternative C
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 Trains			
	Wayside	Wayside/Horn	Horn	Total
Weston	**0**	**0**	**0**	**0**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-30
Alternative D
Number of Existing Noise Sensitive Receptors - 70 dBA L_{dn}

County and Community	Wayside	Wayside/Horn	Horn	Total
Pennington	**0**	**1**	**117**	**118**
Wasta	0	0	12	12
Owanka	0	1	2	3
New Underwood	0	0	9	9
Box Elder	0	0	13	13
Rapid City	0	0	52	52
Ajax	0	0	0	0
Custer	**0**	**0**	**0**	**0**
Hermosa	0	0	0	0
Fairburn	0	0	0	0
Buffalo Gap	0	0	0	0
Fall River	**0**	**0**	**0**	**0**
Oral	0	0	0	0
Smithwick	0	0	0	0
Dudley	0	0	0	0
Marietta	0	0	0	0

Table 4.4-30
Alternative D
Number of Existing Noise Sensitive Receptors - 70 dBA L_{dn}

County and Community	Wayside	Wayside/Horn	Horn	Total
Weston	**0**	**0**	**0**	**0**
Burdock	0	0	0	0
Dewey	0	0	0	0
Clifton	0	0	0	0
Owens	0	0	0	0
Newcastle	0	0	0	0
Osage	0	0	0	0
Clay Spur	0	0	0	0
Upton	0	0	0	0
Colloid	0	0	0	0
Bentley	0	0	0	0
Crook	**0**	**0**	**0**	**0**
Moorcroft	0	0	0	0
Campbell	**0**	**0**	**0**	**0**
Rozet	0	0	0	0

Table 4.4-31
Alternative D
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**1**	**54**	**404**	**459**
Wasta	0	2	23	25
Owanka	0	2	3	5
New Underwood	0	2	18	20
Box Elder	0	3	51	54
Rapid City	0	45	308	353
Ajax	0	0	0	0
Custer	**0**	**1**	**22**	**23**
Hermosa	0	1	4	5
Fairburn	0	0	4	4
Buffalo Gap	0	0	14	14

Table 4.4-31
Alternative D
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 20 MNT

County and Community	Number of Noise Sensitive Receptors for 8 Trains			
	Wayside	Wayside/Horn	Horn	Total
Fall River	**0**	**1**	**26**	**27**
Oral	0	0	17	17
Smithwick	0	0	6	6
Dudley	0	1	1	2
Marietta	0	0	0	0
Weston	**1**	**0**	**128**	**129**
Burdock	0	0	2	2
Dewey	0	0	8	8
Clifton	0	0	0	0
Owens	0	0	1	1
Newcastle	1	0	79	80
Osage	0	0	12	12
Clay Spur	0	0	0	0
Upton	0	0	17	17
Colloid	0	0	0	0
Bentley	0	0	1	1
Crook	**0**	**2**	**55**	**57**
Moorcroft	0	2	55	57
Campbell	**0**	**0**	**6**	**6**
Rozet	0	0	0	0

Table 4.4-32
Alternative B
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**1**	**0**	**0**	**1**
Custer	**0**	**0**	**1**	**1**
Fall River	**0**	**2**	**17**	**19**
Smithwick	0	0	2	2
Heppner	0	1	0	1
Edgemont	0	0	10	10
Marietta	0	1	0	1
Niobrara	**0**	**0**	**0**	**0**
Weston	**0**	**0**	**0**	**0**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-33
Alternative C
Number of Noise Sensitive Receptors - 70 dBA Ldn for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**1**	**0**	**0**	**1**
Custer	**0**	**0**	**1**	**1**
Fall River	**0**	**3**	**6**	**9**
Smithwick	0	0	2	2
Heppner	0	0	1	1
Dudley	0	1	2	3
Marietta	0	1	0	1
Niobrara	**0**	**0**	**0**	**0**

Table 4.4-33
Alternative C
Number of Noise Sensitive Receptors - 70 dBA Ldn for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Weston	**0**	**0**	**0**	**0**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-34
Alternative D
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**3**	**100**	**710**	**813**
Wasta	0	7	32	39
Owanka	0	3	4	7
New Underwood	0	4	42	46
Box Elder	0	8	89	97
Rapid City	0	78	541	619
Ajax	0	0	1	1
Custer	**0**	**3**	**44**	**47**
Hermosa	0	1	11	12
Fairburn	0	0	9	9
Buffalo Gap	0	2	23	25
Fall River	**0**	**6**	**34**	**40**
Oral	0	3	20	23
Smithwick	0	0	9	9
Dudley	0	1	2	3
Marietta	0	1	0	1

Table 4.4-34
Alternative D
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 50 MNT

County and Community	Number of Noise Sensitive Receptors for 18 Trains			
	Wayside	Wayside/Horn	Horn	Total
Weston	**8**	**24**	**325**	**357**
Burdock	0	1	1	2
Dewey	0	2	10	12
Clifton	0	0	1	1
Owens	0	0	1	1
Newcastle	8	18	237	263
Osage	0	1	20	21
Clay Spur	0	0	1	1
Upton	0	0	39	39
Colloid	0	0	0	0
Bentley	0	1	1	2
Crook	**0**	**9**	**82**	**91**
Moorcroft	0	9	82	91
Campbell	**0**	**2**	**10**	**12**
Rozet	0	0	6	6

Table 4.4-35
Alternative B
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**1**	**0**	**0**	**1**
Custer	**0**	**0**	**1**	**1**
Fall River	**0**	**3**	**31**	**34**
Smithwick	0	0	6	6
Heppner	0	1	0	1
Edgemont	0	0	19	19
Marietta	0	1	0	1
Niobrara	**0**	**0**	**0**	**0**

Table 4.4-35
Alternative B
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Weston	**0**	**0**	**0**	**0**
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-36
Alternative C
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**1**	**0**	**0**	**1**
Custer	**0**	**0**	**1**	**1**
Fall River	**0**	**4**	**10**	**14**
Smithwick	0	0	6	6
Heppner	0	0	1	1
Dudley	0	2	1	3
Marietta	0	1	0	1
Niobrara	**0**	**0**	**0**	**0**
Weston	**0**	**0**	**1**	**1**
Darlington	0	0	1	1

Table 4.4-36
Alternative C
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Campbell	**0**	**0**	**1**	**1**
Converse	**0**	**0**	**0**	**0**

Table 4.4-37
Alternative D
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT

County and Community	Number of Noise Sensitive Receptors for 34 Trains			
	Wayside	Wayside/Horn	Horn	Total
Pennington	**4**	**144**	**1,077**	**1,225**
Wasta	0	12	42	54
Owanka	0	3	11	14
New Underwood	0	10	65	75
Box Elder	0	11	146	157
Rapid City	0	108	811	919
Ajax	0	0	1	1
Custer	**0**	**14**	**77**	**91**
Hermosa	0	3	26	29
Fairburn	0	2	17	19
Buffalo Gap	0	9	30	39
Fall River	**0**	**12**	**34**	**46**
Oral	0	4	21	25
Smithwick	0	4	9	13
Dudley	0	2	1	3
Marietta	0	1	0	1

Table 4.4-37
Alternative D
Number of Noise Sensitive Receptors - 70 dBA L_{dn} for 100 MNT

Weston	**13**	**67**	**449**	**529**
Burdock	0	1	2	3
Dewey	0	2	11	13
Clifton	0	0	1	1
Owens	0	1	0	1
Newcastle	12	53	341	406
Osage	0	5	31	36
Clay Spur	0	0	1	1
Upton	0	2	46	48
Colloid	0	0	0	0
Bentley	0	1	1	2
Crook	**0**	**21**	**85**	**106**
Moorcroft	0	21	84	105
Campbell	**1**	**3**	**10**	**14**
Rozet	0	0	7	7

Noise sensitive receptors, the majority of which are residences, would be exposed to noise levels of 65 dBA L_{dn} and 70 dBA L_{dn} by each alternative, under each operating level. For Alternatives B and C, these noise sensitive receptors would mostly be found in Fall River County and would primarily only experience noise levels of 65 dBA L_{dn} and 70 dBA L_{dn} due to horn noise. Alternative D would expose a far greater number of noise sensitive receptors to noise levels of 65 dBA L_{dn} and 70 dBA L_{dn}. Like Alternatives B and C, most of these noise sensitive receptors would be exposed to these noise levels due to horn noise. Alternative D would expose large numbers of noise sensitive receptors to these noise levels in Pennington County (primarily in Rapid City), Custer County, Fall River County, Weston County (primarily in Newcastle), and Crook County (primarily in Moorcroft). While Alternatives B and C would result in substantial increases in the number of noise sensitive receptors exposed to an increase in average daily noise levels, Alternative D would result in a significant increase in noise sensitive receptors exposed to adverse levels of average daily noise.

Because communities have become established along the existing DM&E and BNSF rail lines, Alternative D would have significant community impacts as a result of increased noise. This impact would be due to the entire towns of Owanka, Oral, and Rozet being within the 65 dBA L_{dn} contour for horn noise at the 50 MNT level of operation. At the 100 MNT level, these towns, as well as Wasta, New Underwood, Hermosa, Fairburn, Buffalo Gap, Smithwick, Dudley, Dewey,

and Moorcroft would also be entirely within the 65 dBA L_{dn} contour for horn noise. By contrast, only Oral and Smithwick would be entirely within this contour for Alternative B at 50 MNT and 100 MNT, and Alternative C would only affect Smithwick in this fashion.

SEA recognizes that the majority of noise generated by trains during operations, results from horn soundings. Train horn soundings are deliberately caused, and in many states, required by law, to enhance the safety of vehicles at grade crossings of active rail lines. SEA understands that horn noise can create an adverse environmental impact and is an annoyance. However, SEA has refrained from requiring mitigation of horn noise in past cases, indicating that "any attempt to significantly reduce [train horn] noise levels at grade crossings would jeopardize safety, which we consider to be of paramount importance."[12] A study by the Federal Railroad Administration (FRA) evaluating the impacts of whistle free crossings in Florida on rail safety provides support for SEA's position. In its study, FRA determined vehicle/train accidents increased between 195 and 500 percent, depending on considerations such as how many accidents whistles would not have prevented and what constituted an accident, at crossings where whistle soundings were banned.[13] Additionally, in a joint study between FRA and the Association of American Railroads (AAR), it was determined that crossings with whistle bans averaged 84 percent more collisions than comparable crossings where whistles were sounded.[14]

Recent Federal legislation, specifically the Swift Act (49 U.S.C. 20153), directs the Secretary of the Department of Transportation (DOT) to develop regulations relating to noise and rail safety measures. FRA is the Federal agency within DOT with primary responsibility for establishing train horn requirements and alternatives. On January 13, 2000, FRA published a Notice of Proposed Rulemaking in the Federal Register that proposes requirements for locomotive horn sounding at grade crossings and a procedure for the establishment of "quiet zones" for train horns. FRA defines a quiet zone as a "segment of rail line within which is situated one or a number of consecutive highway-rail crossings at which locomotive horns are not routinely sounded." FRA's proposal includes establishing an application process for communities to obtain FRA approval to establish quiet zones. Approval would require the community to implement supplemental safety measures, such as four-quadrant gates, directional horns, median

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[12] Surface Transportation Board, Section of Environmental Analysis. *Union Pacific Railroad-Control-Southern Pacific Railroad*, Decision No. 44, Finance Docket No. 32760, August 12, 1996.

[13] Federal Railroad Administration. 1999. Cited in *Use of Locomotive Horns at Highway-Rail Grade Crossings; Proposed Rule*. Docket No. FRA-1999-6439, Notice No. 1. Issued December 16, 1999. Federal Register, January 13, 2000.

[14] Ibid.

barriers, temporary road closures, or other measures determined by FRA to be effective at enhancing grade crossing safety. FRA has prepared a Draft EIS as part of its proposed rulemaking. Following completion of the EIS process, FRA will publish the final rule. The final rule will take affect one year after publication of the final rule. FRA is continuing the rulemaking process, however, no dates for publication of the final rule have been proposed. SEA believes that FRA's final regulations will provide a safe, effective means to address horn noise concerns.

4.4.9.2 Vibration

Operation of the proposed project would likely cause ground vibration. This vibration would be caused by the operation of trains over the newly constructed rail line and would travel outward from the rail bed. These ground vibrations are a concern for several reasons. These include:

- structural damage to buildings and residences
- concern for structural damage
- nuisance or inconvenience
- affects on sensitive equipment, such as precision manufacturing tools, electron microscopes, magnetic resonance imaging systems, bench microscopes, micro-balances, laer interferometers, and magnetometers.

Ground vibration would occur due to rail traffic on the newly constructed rail line. Ground vibrations are highly dependent on specific soil conditions (shear stiffness, uniformity, depth to rock, percentage of clay, sand, loam or other soil particles), which are highly variable. The magnitude of these vibrations would be dependent on the size and types of trains, operating weight of these trains, and the characteristics and types of soils adjacent to the rail line. The magnitude of vibration would be the same for all levels of operation because it is caused by only a single train event. The magnitude of vibration would not increase due to additional trains, only the frequency of the vibration event would increase as train numbers increased. SEA conservatively determined, based on previous vibration studies, that ground vibration could be sufficient to cause structural damage to buildings located within 100 feet of the rail line (Appendix F). Table 4.4-38 provide the number of structures within this distance that could be subject to structural damage from ground vibration. These structures could experience minor damage such as cracking of walls or foundations and breakage of items falling from tables, walls, or shelves. Additionally, individuals occupying these structures would experience vibration at levels likely to cause disturbance of daily life and be considered a nuisance. Such disturbances could include rattling of windows, items on tables, walls, and shelves; and interuption of sleep, conversation, or listening activities (television, radio, etc.).

Beyond 100 feet, ground vibration would be expected to lessen to a magnitude that would not result in structural damage. However, SEA determined, based on previous studies of rail vibration (Appendix F) that, between 101 and 200 feet, ground vibration could be of sufficient magnitude to cause concern that structural damage could occur. Structural damage within this range would be unlikely. Individuals could experience concern and frustration due to worrying about potential damage. Quality of life may be reduced as a result of frequent vibration events and the potential disturbance and inconvenience associated with rattling of windows, walls, pictures, and items on shelves, and minor damage that may occur to these items.

Ground vibration is anticipated to extend outward from the existing rail line for several hundred feet. Beyond 200 feet, ground vibration may still be above the level of human perception. SEA determined that structures between 201 and 400 feet from the rail line would perceive some level of ground vibration. This vibration would present an inconvenience of annoyance to individuals experiencing it. However, it would not be expected to cause any structural damage or significant reduction in individuals' quality of life.

Ground vibration, even at levels below those perceived by humans, may effect sensitive equipment such as that found in hospitals and major medical facilities. Such facilities have not been identified along any of the proposed alternatives. Therefore, no impacts to the use or operation of sensitive equipment are anticipated to occur from any of the Extension Alternatives.

Table 4.4-38
Rail Line Extension Alternatives
Structures Potentially Impacted by Vibration

Alternative	0-100 feet	101-200 feet	201-400 feet
Alternative B	0	1	1
Alternative C	2	2	3
Alternative D	3	11	61

4.4.10 BIOLOGICAL RESOURCES

4.4.10.1 Vegetation

This Section discusses the impacts of construction and operation of the proposed project alternative to vegetative communities found throughout the project area. Impacts to vegetative species classified as endangered, threatened, or proposed for such classification are discussed in Section 4.4.12.

Impacts to vegetation would occur primarily as a result of conversion of vegetated land to rail line right-of-way. During construction, vegetation would be cleared from the right-of-way, resulting in a reduction in the amount of those vegetative communities present within the right-of-way. Local reductions in vegetation diversity could occur. Native vegetative communities within the right-of-way would be lost. Trees and shrubs (uncommon in the project area and considered an important community by state agencies and Federal land managers) within the right-of-way would be cleared. Should construction activities be required outside the right-of-way, additional areas of vegetation could be damaged or destroyed. Construction of access roads, material staging and laydown yards, mancamps, and borrow and soil stockpile areas outside the rail line right-of-way would also result in damage or loss of vegetation.

Following construction, disturbed areas of the right-of-way would be reclaimed. Once the rail line is completed, vegetation would not be allowed to grow in the rail bed ballast and rails, and would probably be maintained with low-growing herbaceous forms within the rail bed grade and associated ditches. Those areas would be lost to reestablishment of native vegetation over the long-term. From the outer margins of the rail bed ditch to DM&E's right-of-way edge opportunities may exist for revegetating disturbed areas for native plant species as long as growth forms meet safety requirements for the operating railroad. But, from DM&E's right-of-way to the outer edge of disturbed construction zones, disturbed vegetation would be reclaimed to land owner specifications. Vegetation from adjacent right-of-way areas would be anticipated to reestablish within these areas of the right-of-way.

The success of reclamation efforts and reestablishment of vegetation within the right-of-way would depend on treatment and handling of topsoil during construction, seed mixes selected, soil characteristics, and availability of moisture. Problem areas that may be difficult to revegetate include soils with limiting chemical or physical characteristics that restrict plant establishment because of nutrient imbalances or limits the soils moisture storage capacity. Reclamation and reestablishment of herbaceous vegetation could take several years to return to preconstruction conditions, may never return to the preconstruction condition, or may exceed the preconstruction condition in quality, quantity, and composition of vegetative cover. Impacts to vegetation

communities dominated by shrub and tree species are more long-term since reestablishment of these species takes many more years compared to herbaceous or grassland type communities. For example, big sagebrush plant community may take 10 to 20 years, woodlands 25 to 75 years, and riparian and woody draws take10 to 60 years to become established to preconstruction condition. Impacts to these vegetation types may adversely affect wildlife species that are, in some way, dependent on them.

Disturbed areas that become heavily infested with weeds could also hinder successful revegetation causing long-term impacts. Most noxious weeds are opportunistic, introduced species which become particular problems when the native communities are disturbed.

Additionally, in areas maintained as a fire break along the right-of-way, plowing, mowing, or application of herbicides would prevent establishment of significant vegetative cover. Establishment of noxious weeds within the right-of-way would be possible due to disturbance of large areas of soil. Once established in the right-of-way, these weeds would compete with other species within the right-of-way and provide a source of seed for spreading into adjacent areas. Fires resulting from rail line operation and maintenance activities would damage or destroy adjacent vegetation, potentially resulting in new communities or noxious weeds becoming established in fire-disturbed areas.

Alternative B (Proposed Action)

In South Dakota, this alternative passes through approximately 92.4 miles (approximately 4,480.0 acres) of grasslands, 16.1 miles (approximately 780.6 acres) of cropland and pasture, and 2.2 miles (approximately 106.7 acres) of coniferous woodlands and 0.9 mile (approximately 43.6 acres) of wetlands. In Wyoming, this alternative passes through approximately 128.0 miles (approximately 6,206.1 acres) of grasslands, 7.7 miles (approximately 373.3 acres) of cropland and pastures, and 14.6 miles (approximately 707.9 acres) of big sagebrush shrublands, and 0.5 miles (approximately 24.2 acres) of deciduous woodlands, and approximately 0.4 mile (19.5 acres) of wetlands.

Alternative C (Modified Proposed Alternative)

In South Dakota, Alternate C passes through approximately 106.7 miles (approximately 5,173.3 acres) of grasslands, 18.2 miles (approximately 882.4 acres) of cropland and pastures, 0.7 mile (approximately 33.9 acres) of deciduous woodlands, and 3.0 miles (approximately 145.4 acres) of coniferous woodlands, and 1.0 mile (approximately 48.2 acres) of wetlands. In Wyoming, Alternative C passes through approximately 110.3 miles (approximately 5,347.9 acres) of grasslands, 9.0 miles (approximately 436.4 acres) of cropland and 11.3 miles (approximately

547.9 acres) of big sagebrush shrublands, 0.3 miles (approximately 14.5 acres) of coniferous woodlands, and 0.3 mile (approximately 13.6 acres) of wetlands.

Alternative D (Existing Corridors Alternative)

In South Dakota, this route passes through approximately 119.2 miles (approximately 2,889.7 acres) of grasslands, 42.5 miles (approximately 1,030.3 acres) of croplands and pastures, 0.5 miles (approximately 12.1 acres) of deciduous forest, and 2.3 miles (approximately 55.7 acres) of coniferous forest, and 0.4 miles (approximately 9.4 acres) of wetlands. In Wyoming, this route passes through approximately 68.8 miles (approximately 1,667.9 acres) of grasslands, 8.5 miles (approximately 206.1 acres) of croplands and pastures, and 80.7 miles (approximately 1,956.4 acres) of big sagebrush shrublands. In addition, the route passes through 7.0 miles (approximately 169.7 acres) of coniferous woodlands, and 1.2 miles (approximately 31.6 acres) of wetlands.

4.4.10.2 Wildlife

This Section discusses the potential impacts to wildlife resources throughout the project area for the proposed project alternatives from construction and operation of a new rail line. Impacts to species classified as Federally endangered, threatened, or proposed for such listings are discussed in Section 4.4.1.0.4

A wide variety of wildlife occur throughout the project area. Specific impacts to the different types of wildlife vary between the different categories of wildlife and between alternatives. The impacts expected from each Extension Alternative are discussed below for each category of wildlife. The general types of impacts to wildlife from construction and operation of the proposed project alternatives would include:

- Disturbance during construction and operation due to noise and human activities leading to abandonment of habitat, even suitable habitat outside the rail line right-of-way.
- Alteration or impedence to big game movement and migration patterns due to the barrier provided by rail line fences and the rail bed.
- Mortality and injury caused by construction vehicles, equipment or train/animal collisions.
- Increased hunting pressure and possibly illegal harvesting and poaching due to local population increases from the influx of construction workers.
- Increased competition for forage with livestock due to reduction in habitat.
- Direct and indirect loss of game and non-game wildlife habitats, including nesting and young rearing areas; foraging and watering sites; escape, thermal and hiding cover; and resting or loafing areas due to conversion of current habitat to rail line right-of-way.

- Displacement of wildlife away from suitable or preferred habitats due to construction and human disturbance.
- Disturbance and disruption, particularly to nesting raptors and other birds, due to noise and activity generated by construction activities and passing train traffic.
- Decline in overall numbers of certain species due to lost habitat, fragmented habitat, mortality, and/or continued disturbance.
- Potential contamination of habitats or exposure to hazardous materials due to increased train traffic and new rail lines increasing the potential for derailments and diesel fuel spills.
- Establishment of noxious weeds and undesirable plant species in the rail line right-of-way allowing them to encroach on adjacent areas, reducing desirable forage in these areas.

4.4.10.2.1 Big Game

The only measurable impact to big game is the amount of habitat lost due to conversion to rail line right-of-way. Habitats used by big game vary seasonally. Therefore, seasonal ranges are delineated for each species. Generally, yearlong or summer ranges make up the majority of a species overall range. While necessary for the health of the population, the amount of these ranges and the lack of stresses (such as lack of food, cold, hunting pressure) make these habitats less important overall. Winter ranges, particularly crucial or severe winter range, are often vital to the survival of a particular population as they provide necessary relief from severe conditions such as lack of food or water and severe weather. Such habitats generally comprise only a small portion of a big game species overall range and their loss is therefore more significant. In Wyoming, pronghorn, mule deer, white-tailed deer, and elk seasonal ranges would be affected by each of the alternatives. Likewise, habitats used by pronghorn and deer (white-tailed deer and mule deer) would be affected in South Dakota.

The functions and value of seasonal big game ranges may be impaired by construction and operation of the proposed project. Disturbances from construction activities and operating trains during winter stress periods can lead to increased energy expense and increased big game mortality (Hobbs, 1989). Such disturbances during construction would be unlikely as construction during winter months would be limited to scattered crews installing bridges and culverts. As these activities would be limited to small areas, big game using the vicinity would be able to seek refuge in other areas. Additionally, crucial and severe winter range is generally necessary during only the most severe winter conditions which may not occur every year. During severe weather, it is likely construction activities would be halted so crews would not be out, allowing big game to be undisturbed during the more severe conditions. However, during rail line operations, trains operating at random times day and night could cause significant wildlife disturbances during high-stress periods for big game.

Big game would also likely be disturbed by passing trains throughout the year. Some individuals would likely adapt to passing trains and be relatively undisturbed, seeking only to move away a sufficient distance to feel secure. Some reduced use of suitable habitat and forage adjacent to the rail line may occur. However, as noted above, during severe conditions, the added stress of passing trains to animals otherwise adapted to them may be harmful.

In addition to disturbance from human activities and noise associated with the project alternatives, big game are likely to be killed by vehicle and train traffic. Increased traffic during construction would increase the likelihood of a vehicle/animal collision. Once the project is operational, it is likely that a new railroad passing through big game habitat in the proposed project area would lead to train/animal collisions. More mortalities are expected:

- during winter when animals are concentrated in large groups than in summer when they are dispersed,
- with higher train traffic volume than with fewer trains,
- during night when animals may be more active than during daytime, and
- with higher train speeds (as with empty west-bound trains) than slower trains loaded with coal.

Also, big game are most likely to be killed in areas where they have little or no escape away from the tracks. Such situations could include areas where the rail line passes through a cut and where right-of-way fences are constructed close to tracks. While fences may inhibit some animals from moving onto the tracks and rail bed, they also inhibit animals from reaching areas on the other side, thereby trapping them within the rail line right-of-way as well as isolating and fragmenting portions of their habitats found on opposite sides of the rail line. Fences could pose a significant barrier to big game use of habitats along the Cheyenne River where animals are expected to be highly motivated to move to water from feeding areas or shelter/cover in upland habitats. Fences can lead to under-utilization of habitat, leading to loss of habitat function. Such impact would be especially acute if animals were prevented from reaching winter or severe winter relief ranges during critical winter periods. Each of the alternatives would have similar impacts, differing in the degree of impact depending on the number of miles of each seasonal range crossed.

Table 4.4-39 lists the number of miles of big game seasonal ranges crossed by each alternative.

Table 4.4-39
Comparison of Big Game Habitat between the Alternatives

	Alternative B (miles)	Alternative C (miles)	Alternative D (miles)
South Dakota			
Pronghorn			
Winter Range	4.0	4.2	0
Yearlong Range	10.3	26.6	25.0
Mule Deer/White-tailed Deer			
Winter Range	29.8	23.5	0
Yearlong Range	71.7	54.0	61.5
Wyoming			
Pronghorn			
Winter-Yearlong Range	39.6	40.5	73.8
Yearlong Range	109.3	88.3	84.3
Severe Winter Relief Range	2.3	2.4	2.5
Winter Range	0	0	5.2
Mule Deer			
Winter Yearlong Range	11.0	9.0	36.8
Yearlong Range	123.5	103.4	108.3
Elk			
Winter Yearlong Range	9.7	4.7	4.7
Yearlong Range	21.8	21.4	16.5
Crucial Winter Range	0.4	2.5	2.5

Although Alternative D would affect the most miles of pronghorn winter range, approximately 73.8 miles, its location within and adjacent to existing rail rights-of-way would reduce the actual acres (1,789.1 acres) of this range lost. Alternative C would result in the greatest loss of pronghorn winter range in both South Dakota and Wyoming, approximately 44.7 miles (2,167.3 acres). Alternative B would result in the most loss of deer and elk winter range, approximately 40.8 miles (1,978.2 acres) and 9.7 miles (470.3 acres), respectively. For elk, both

Alternative C and D would impact more crucial winter range than Alternative B, 2.5 miles (121.2 acres)[15] compared to 0.4 miles (19.4 acres) for Alternative B.

4.4.10.2.2 Game Species

Upland Game Birds

Construction and operation of the railroad through South Dakota and Wyoming would contribute to existing habitat fragmentation of sage grouse populations. The decline of sage grouse throughout the west is of increasing concern. Reasons for their decline have been attributed to: conversion of sagebrush-grasslands to agriculture; herbicide and mechanical treatments to convert sagebrush to pastureland for livestock; livestock grazing that removes concealing vegetation revealing nest sites which could expose them to predation; mining and energy developments; creation of reservoirs that eliminate riparian zones utilized by sage grouse broods, expansion of human settlements into sage grouse habitats and; fragmentation of habitats by fence lines, highways, and power lines. Mating displays by male sage grouse as well as male sharp-tailed grouse involve acoustic signals coupled with visual displays (Eng *et* al, 1979; Vehrencamp and Bradbury 1989; Gibson and Bradbury 1985; Gibson, 1989, 1992, 1996; Gratson 1993) so that constant noise could interfere with females' attraction to males' displays.

Existing background noise on the project area in both states is expected to be similar to EPA's "farm in valley" noise category which is about 39 dBA in daytime and 32 dBA at night. Noises increases associated with construction could disrupt mating displays on nearby leks. However, these increases would be temporary during the construction of the rail line in the vicinity of the lek(s). If construction activities occur in the vicinity of a lek, but outside the breeding season, such disturbances would not be expected.

Noise increases associated with the introduction of train traffic would be long-term for the life of the project. SEA's estimates of the distance at which noise from train horn soundings and wayside noise would diminish to background daytime noise levels (39 dBA) ranges from 39,000 feet (7.4 miles) for horn noise to 23,000 feet (4.4 miles) for wayside noise. Attenuation distances are much greater for noise to diminish to nighttime background levels (32 dBA), estimated to be 49,000 feet (9.3 miles) for horn noise and 32,000 feet (6.1 miles) for wayside noise.

[15] Elk crucial winter range crossed by Alternatives C and D occurs in an area where these alternatives share the same alignment and involve new construction. For analysis purposes, because neither alternative would be adjacent to an existing rail line, a 400-foot average right-of-way is used to estimate the amount of habitat lost.

Noise levels of 60 dBA are comparable to EPA's "noisy urban residential" category. Wayside noise would reach that level at 5,700 feet (1.1 mile) from the tracks while horn noise would attenuate to 60 dBA approximately 16,000 feet (3.0 miles) away. There are numerous sage grouse leks but fewer known sharp-tailed grouse leks within those distances of the proposed alternatives in both states. Numbers of leks potentially impacted by noise increases are included below for each alternative.

In addition, there are wild turkey roosts along the Cheyenne River in South Dakota and mourning doves and pheasants are likely to nest anywhere along the proposed alternative, particularly in South Dakota. Wild turkey strutting and courtship areas during the toms' "gobbling" season exist throughout woody draws, the Bad and Cheyenne River corridors, and riparian zones of tributaries of the Bad and Cheyenne Rivers in South Dakota. Responses by these upland game bird species to the loss of habitat and levels of noise and activity associated with the construction of a new rail line is difficult to predict. However, they would likely be similar to impacts described in Section 4.3.11. Construction noise and disturbance would displace individuals from the right-of-way and adjacent areas. Any habitat for roosting, nesting, or foraging within the right-of-way would be lost, as would any nests present at the time of construction. Females hesitant to leave a nest of eggs or chicks could also be lost. During operation of the rail line, upland birds would likely move back into adjacent areas along the rail line, particularly if suitable habitat is available. Some mortality to young birds and chicks may periodically occur due to collisions with passing trains. Individuals would likely adapt to passing trains and be generally undisturbed by them. However, during severe weather, disturbance from passing trains, causing birds to flush from cover or roosts could result in excessive stress leading to mortality. However, as trains would occur daily, individuals disturbed by trains would be expected to select habitats in other areas, minimizing the potential for impacts to upland birds.

Game birds can also be subject to direct mortality during construction and operation of any alternative. Sage grouse, pheasants, wild turkeys, mourning doves, and sharp-tailed grouse nest on the ground in situations varying in degrees of vegetation cover. Birds incubating eggs and broods of chicks would be killed if project-related vehicles drive over nests. Birds could also be struck by trains (Bennett, 1991).

Alternative B (Proposed Action)

Short-term construction surface disturbances and associated noise occurring when sage grouse and sharp-tailed grouse are attending leks could inhibit courtship and reproduction. There are 5 sage grouse and 6 unidentified leks within 1.0 mile, and 12 sage grouse and 18 unidentified leks within 2.0 miles of Alternative B in South Dakota. In Wyoming there are 14 sage grouse

leks within 1.0 mile and 26 sage grouse leks within 2.0 miles of this alternative. Alternative B would cross approximately 14.6 miles (707.9 acres) of sagebrush habitat.

In South Dakota, wild turkeys utilize the riparian zones along the Cheyenne River and its tributaries during courtship. Eight "gobbling" toms with harems were observed within 0.5 to 1.0 mile of Alternative B during 1999 aerial surveys for raptors. More than those gobbling sites probably occur along this route. The response of wild turkeys during courtship and nesting to construction activities and noises are unknown, but impacts, if they occur, are most likely at sites proximate to or through riparian zones and ponderosa pine-juniper woodlands. Approximately 2.2 miles of woodland habitat is crossed by Alternative B, all in South Dakota. Nesting wild turkeys, sage grouse, pheasants, mourning doves, and sharp-tailed grouse could be impacted by construction within the various undisturbed habitats that occur along the right-of-way.

Alternative C (Modified Proposed Action)

In South Dakota there are 2 unidentified leks within 0.25 mile, 6 sage grouse and 12 unidentified leks within 1.0 mile, and 3 sage grouse and 23 unidentified leks within 2.0 miles of Alternative C. In Wyoming there are 2 sage grouse leks within 0.25 mile, 10 sage grouse within 1.0 mile, and 19 sage grouse leks within 2.0 miles of this alternative. Alternative C would cross approximately 11.3 miles (547.9 acres) of sagebrush habitat.

Six "gobbling" toms with harems were observed between 0.5 to 1.0 mile of Alternative C during 1999 aerial surveys for raptors. More than those probably occur along the route. Impacts would be similar to those discussed for Alternative B, however, Alternative C would impact more miles of woodland habitat, approximately 4.4 miles more than Alternative B.

Alternative D (Existing Corridors Alternative)

There are 6 sage grouse leks within 1.0 mile and 11 sage grouse leks within 2.0 miles of Alternative D in South Dakota. In Wyoming there are 2 sage grouse leks within 0.25 mile, 9 sage grouse leks within 1.0 mile, and 20 sage grouse leks within 2.0 mile of this alternative. Alternative D would cross approximately 80.7 miles (1,956.4 acres) of sagebrush habitat.

Seven "gobbling" toms with harems were observed within 0.5 to 1 mile of Alternative D during 1999 aerial surveys for raptors. Alternative D would cross the most woodland habitat, approximately 7.0 miles. However, it would be expected to have similar or less impacts to wild turkeys than the other alternatives due to it occurring within or adjacent to existing, active rail line right-of-way for the majority of its length.

Waterfowl

Potential impacts to waterfowl due to construction and operation of the Extension Alternatives would be most likely:

- during the nesting period, and
- where the proposed route is near the Cheyenne River or other perennial sources of water in South Dakota and Wyoming.

Waterfowl species nest in a variety of locations. However, most select upland habitats near permanent water for nest sites as these areas provide nesting material and cover. After the eggs hatch, the hens move the brood to water for food and safety. During the nesting period, construction activities across upland areas throughout the project area and along all of the alternatives, have the potential to destroy nests, eggs, chicks, and hens within the right-of-way. Construction activities along a particular portion of an alternative route occurring before or after the nesting season would avoid these impacts. However, as waterfowl may renest throughout the summer, it is likely some could be nesting within the right-of-way even during construction in mid-summer. Habitat within the right-of-way would be lost. Nesting birds in adjacent areas may abandon their nest due to increased human activity and noise during construction. Construction across streams, rivers, and wetlands may cause waterfowl to abandon these areas. If young or molting adults unable to fly are disturbed, they could become more susceptible to predation. Accidental release of oils and other petroleum products into the Cheyenne River, its tributaries, or wetlands also could adversely affect waterfowl by contaminating the water and food supply.

During rail line operation, waterfowl may avoid areas within and adjacent to the rail line due to disturbance from passing trains. Others would have adapted to the disturbance and select to nest in these areas. Some mortality to adults and chicks may occur if they wander onto the rail line when traveling to water. If spills of hazardous materials occur during train movements and enter wetlands or waterways, waterfowl could be lost from water or food contamination.

Alternative B (Proposed Action)

The distance that the right-of-way for Alternative B would be within 0.5 mile and 1.0 mile and the number of locations and total distance where Alternative B would be within 500 feet of the Cheyenne River and its perennial tributaries in South Dakota and Wyoming provide some indication of the level of impact construction could have to waterfowl inhabiting these drainages. Approximately 128.8 miles of Alternative B would be within 1.0 mile of a perennial stream, 85.0 miles would be within 0.5 mile, and 21.9 miles would be within 500 feet of a perennial stream. Alternative B would cross 20 perennial and 623 intermittent streams and convert over 62.1 acres

of wetland to rail line right-of-way. There is no information about the levels of actual waterfowl use of these drainages but observations indicate they are used by various species during migration and for nesting. Alternative B would also convert approximately 11,840.0 acres of suitable nesting habitat to rail line right-of-way.

Alternative C (Modified Proposed Action)

Approximately 93.4 miles of Alternative C would be within 1.0 mile of a perennial stream or river, 58.5 miles would be within 0.5 mile, and 20.8 miles would be within 500 feet of these. Each of these zones of potential effects to waterfowl is less than estimates made for Alternative B. Alternative C would have 14 perennial and 520 intermittent stream crossing and convert 62.2 acres of wetland and 11,840.0 acres of potential nesting habitat to rail line right-of-way.

Alternative D (Existing Corridors Alternative)

Approximately 45.1 miles of Alternative D would be within 1.0 mile of a perennial stream or river, 29.9 miles would be within 0.5 mile, and 13.5 miles would be within 500 feet of these. Each of these zones of potential effects to waterfowl is less than estimates made for Alternatives B and C. Alternative D would cross 68 perennial and 707 intermittent streams and convert 40.7 acres of wetland and 5,794.0 acres of potential nesting habitat to rail line right-of-way. However, as noted previously, 237 of these crossings are existing and the majority of the habitat lost would be within or adjacent to existing rail line right-of-way.

Small Game and Furbearers

Small game mammals, such as desert cottontails, are most likely to be impacted during construction. Since many small game mammals and furbearers are relatively small and nocturnal, they are susceptible to being killed by vehicles. Increased traffic from construction vehicles during the early morning and evening hours would likely result in some mortality. Habitat for these species within the right-of-way and at stream crossings would be lost during construction. Construction disturbance may drive these species into areas further removed from the rail line.

Once constructed, the operation of trains would likely result in mortality to individuals of these species, particularly the more terrestrial and mobile ones such as cottontail, fox, coyote,and jackrabbit. Since terrestrial furbearers (fox, coyote, badger) are carnivores, they are likely to be attracted to carrion of big game and other wildlife killed by trains during operation. Animals attracted to or feeding in the rail line right-of-way are likely to themselves become casualties. As aquatic animals, river otter, beaver and muskrat could be adversely affected by accidental

release of petroleum products during construction or operation; since their abilities to thermoregulate are severely hampered if fur becomes coated with oil (McEwan *et al.*, 1974).

Small game and furbearers are generally highly mobile and wide ranging, occurring in areas of suitable habitat. As suitable habitat for these species occurs along each of the Extension Alternatives, individuals along the alternatives would be capable of moving to other areas, and individuals from distances in excess of a mile or more would be capable of coming in contact with any of the alternatives, impacts to small game and furbearers were determined to not differ substantially between alternatives. The greatest impact to these species would likely be concentrated along those portions of the alternatives where they follow the Bad River, in the case of Alternative D, and the Cheyenne River, Alternatives B and C. However, impacts would occur along the entire portions of the alternatives. Alternative D has the potential to have a greater overall impact due to its greater length and creating two parallel rail lines to be crossed.

4.4.10.2.3 Non-Game Species

Amphibians and Reptiles

Because they are relatively immobile, amphibian and reptile species found within the right-of-way would likely be killed by construction activities. Those avoiding death would be displaced during construction due to construction activities and loss of habitat. Potential spills of contaminants (diesel fuel, lubricating oil, etc.) associated with construction could impact these species. However, it is anticipated that amphibians and reptiles would return once construction is completed and the right-of-way becomes revegetated. Increased vehicular traffic on roadways during construction would likely increase incidental mortality. Some mortality from passing trains or individuals becoming trapped between rails is also expected.

The distance that the right-of-way for the Extension Alternatives would be within 0.5 mile and 1.0 mile and the number of locations and total distance where Alternative B would be within 500 feet of the Cheyenne River and its perennial tributaries in South Dakota and Wyoming provide some indication of the level of impact construction could have to amphibians as these species are dependent on water. Reptiles could occur anywhere along the Extension Alternatives. Therefore, the total distance of these alternatives provides the main indication of the potential level of impact, with the longer alternatives having potentially more impact.

Alternative B (Proposed Action)

Approximately 112.0 miles of Alternative B would be within 1.0 mile of a perennial stream, 74.0 miles would be within 0.5 mile, and 19.1 miles would be within 500 feet of a

perennial stream. Alternative B would cross 20 perennial and 623 intermittent streams and convert over 62.1acres of wetland to rail line right-of-way. Alternative B would include construction of approximately 265.8 miles of new rail line.

Alternative C (Modified Proposed Action)

Approximately 81.0 miles of Alternative C would be within 1.0 mile of a perennial stream or river, 50.0 miles would be within 0.5 mile, and 20.8 miles would be within 500 feet of these. Alternative C would have 14 perennial and 520 intermittent stream crossing and convert 62.2 acres of wetland to rail line right-of-way. Alternative C would include construction of approximately 253.8 miles of new rail line.

Alternative D (Existing Corridors Alternative)

Approximately 46.0 miles of Alternative D would be within 1.0 mile of a perennial stream or river, 30.0 miles would be within 0.5 mile, and 13.5 miles would be within 500 feet of these. Alternative D would cross 68 perennial and 707 intermittent streams and convert 40.7 acres of wetland to rail line right-of-way. Alternative D would include construction of approximately 233.2 miles of new rail line.

Songbirds

The degree to which anticipated noise levels displace non-game birds from habitats adjacent to the railroad is unknown and undoubtedly varies by species and local conditions. Abandonment of occupied habitats within some distance of the railroad is likely, particularly by nesting birds. Sound attenuation though, is likely to be greater in woods than grasslands due to trees absorbing and deflecting sound, and the distance of noise effects on breeding birds could be greater in grasslands than in woodlands.

Passerine birds that are obligate shrub-steppe or riparian woodland (cottonwood and willow) nesting species would be most affected by loss of shrubs and riparian woodlands and fragmentation of shrub-dominated and woodland habitats as these habitats are limited in the project area. Songbirds using other habitats would be relatively unaffected by construction as grassland and sagebrush shrublands are abundantly available. Short-term impacts include loss of nests within the right-of-way for both tree and ground nesting species during construction. Noise during construction is expected to temporarily disturb songbirds causing them to avoid the right-of-way and possibly adjacent areas. Shrub-nesting songbirds would experience a loss of habitat and disturbance to adjacent shrublands, many of which may become unsuitable due to their being fragmented into small sizes that would not provide adequate cover or security for nesting birds.

As these habitats take many years (10 to 75 years) to reestablish, their loss could result in a significant reduction in the number of these species nesting in the area for many years. All of the proposed alternatives would cross less than 1.0 mile of riparian shrub- and woodlands. Alternative B would cross 2.2 miles of woodlands (106.7 acres) and 14.6 miles (707.9 acres) of shrubland; Alternative C would cross 4.0 miles (11.9 acres) of woodlands and 11.3 miles (547.9 acres) of shrubland; and Alternative D would cross 9.8 miles (237.5 acres) of woodlands and 80.7 miles (1,954.4 acres) of shrubland.

Operation and maintenance of the rail line is not expected to have much of an impact on songbirds as many species have adapted to human activity and human disturbances such as roadways and rail lines. Revegetation of the right-of-way would provide nesting and cover habitat for a variety of species, potentially of higher quality than adjacent areas, particularly those subject to grazing.

Shorebirds

Shorebirds use wetlands, uplands, and areas along rivers and streams along each of the Extension Alternatives. Impacts to shorebirds would be similar to those discussed previously for waterfowl.

Small Mammals

The only certain impact to small mammals by construction and operation of any of the alternatives is loss of habitat and mortality. Effects would be especially acute for those species restricted to very limited habitats, including cottonwood-riparian, shrub-dominated woody draws, and coniferous woodlands in the project area. Loss of these habitats could be significant to local populations of species dependent on them as discussed previously for songbirds also dependent upon them. Mortality would likely occur during construction as these species are less mobile and less capable of avoiding construction equipment than their larger, small game and furbearer relatives. Many would likely be lost in their burrows during earthmoving activities. While local populations of species dependent on limited habitats could be significantly reduced, other species would be expected to quickly repopulate disturbed areas due to their high reproductive potentials. Mortality could continue to occur during rail line operation from individuals being hit by trains or becoming trapped between the rail, thus being susceptible to predation and exposure. Overall, impacts to small mammals are not anticipated, except to those species dependent on shrub- and woodlands. Impacts to these species would be related to the amount of these habitats affected by each alternative, as described under songbirds.

Raptors

The construction and operation of any of the Extension Alternatives has the potential to impact various species of raptors in the project area. Noise and human activity during construction may disturb nesting, roosting, and foraging birds. Species with nests in the right-of-way, both on the ground and in trees, would have their nests destroyed during construction activities. Nests in nearby adjacent areas may be abandoned or go unused due to construction related disturbances. Operation of the rail line alternatives would continue to produce noise and human activity disturbances, potentially causing raptors to abandon suitable nests or nesting sites near the rail line. Mortality to raptors could occur, particularly if flying low across the rail line in search of prey or if feeding on carrion along the rail line.

In their study of responses by nesting ferruginous hawks to human disturbances, White and Thurow (1985) concluded that 90 percent of all nesting adults would not flush from nests if the disturbance was more than 250 meters (820 feet) away. The researchers cautioned, though, that distances of effect would expand when prey are scarce. During these times ferruginous hawks must spend more time searching for prey and appear to be less tolerant of disturbances (White and Thurow, 1985).

Impacts to nesting golden eagles, prairie falcons, red-tailed hawks, northern harriers and American kestrels would be similar to those discussed for ferruginous hawks. However, all of these raptor species are somewhat adaptable to human disturbance whereas ferruginous hawks seem to lack such adaptability. During rail line operation, certain individual pairs of raptors would be expected to adapt to the presence of operating trains. These individuals would likely nest in suitable habitat adjacent to the right-of-way, provided they have an adequate buffer for security. Some disturbance to adults and young may occur, however, both would be constantly exposed to passing trains and over time would be undisturbed by them. Red-tailed hawks and golden eagles remained in home ranges when exposed to military training activities (Andersen *et al.*, 1990) and blasting did not adversely affect prairie falcon productivity (Holthuijzen *et al.*, 1990). Parent birds can desert eggs or young but the potential for nest desertion varies between raptor species and is more likely early in the nesting season than after young have hatched (Suter and Jones, 1981).

Other potential effects of disturbance include damage to eggs and young by frightened adults, cooling, overheating and loss of moisture from eggs or young if adult birds remain away from nests for too long, missed feedings of chicks, premature fledging of older nestlings, and increased exposure to predators if adults leave nests unattended (Fyfe and Olendorff, 1976; Grier and Fyfe, 1987). Individuals nesting near the rail line would be at increased risk of being stuck by

a train when taking off from a nest or landing. This would be of particular concern for ground nesting raptors, like ferruginous hawks, that may nest in or adjacent to the right-of-way.

Project activities are not expected to displace wintering golden eagles and rough-legged hawks from available hunting grounds. However, these species show greater flushing response to humans walking than to approaching vehicles. Wintering rough-legged hawks when perched are most sensitive to vehicles within 550 feet while wintering golden eagles tended to not respond to vehicles (Holmes *et al.*, 1993). Impacts to wintering raptors are expected to be minor since prey is expected to remain available throughout the area and construction during winter would be limited to scattered installation of stream crossing structures. However, some mortality may occur due to raptors using carrion along the rail line, particularly younger birds that may be less skilled at finding food.

No impacts to peregrine falcons are anticipated since there is no documentation of their occurrence within the project area except infrequently, during migrations.

Alternative B (Proposed Action)

Available data indicates there are 12 raptor nests within 0.5 mile (2,640 feet) of the proposed right-of-way for Alternative B in South Dakota and 71 nests within that distance in Wyoming. Most of the potential nesting habitats for golden eagles, red-tailed hawks, Swainson's hawks, and great horned owls are in riparian corridors. Nearly 85.0 miles of Alternative B would pass within 0.5 mile of potential nesting habitat in riparian zones in both states. Alternative B would also result in the loss of 130.9 acres of woodland.

Raptors nesting within 0.25 mile (1,320 feet) of the right-of-way are most likely to be adversely affected by short-term construction impacts during the nesting season. In South Dakota, there are 5 red-tailed hawk nests within 0.25 mile of Alternative B. In Wyoming, there are 7 red-tailed hawk nests, 5 golden eagle nests, 1 great horned owl nest, and 17 ferruginous hawk nests within that distance. Of those species, ferruginous hawks are most likely to abandon nests if disturbed during the nesting period since they are more sensitive to disturbance than other species. However, many ferruginous hawk nests and nests of other species that are within 0.25 mile of the proposed route have not been active recently. Nests closest to the proposed right-of-way could be most at-risk if individuals in the temporary work force were involved in illegal shooting, an additional potential short-term impact to raptors.

Alternative C (Modified Proposed Action)

Available data indicates there are 12 raptor nests within 0.5 mile of the proposed right-of-way for Alternative C in South Dakota and 67 nests within that distance of Alternative C in Wyoming. Most of the potential nesting habitats for golden eagles, red-tailed hawks, Swainson's hawks, and great horned owls are along the riparian corridors associated with the Cheyenne River and tributaries. Approximately 58.5 miles of Alternative C would pass within 0.5 mile of potential wintering habitats in those riparian zones in both states compared to 85.0 miles similarly affected by Alternative B. Alternative C would result in the loss of 48.4 acres of woodland.

Raptors nesting within 0.25 mile of the right-of-way are most likely to be adversely affected by short-term construction impacts during the nesting season. In South Dakota, there are 6 red-tailed hawk nests, 2 golden eagle nests, and 1 great horned owl nest all within 0.25 mile of Alternative C. But in Wyoming, there are 7 red-tailed hawk nests, 6 golden eagle nests, 2 great horned owl nests, 1 Swainson's hawk nest and 22 ferruginous hawk nests within that distance.

Alternative D (Existing Corridors Alternative)

Available data indicates there are 8 nests within 0.5 mile of the proposed right-of-way for Alternative D in South Dakota and 69 nests within that distance of Alternative D in Wyoming. There are probably more than these within 0.5 mile but much of Alternative D in both states was not surveyed for raptors. Most of the potential nesting habitats for golden eagles, red-tailed hawks, Swainson's hawks, and great horned owls are in riparian corridors associated with the Cheyenne River and tributaries. Only 29.9 miles of Alternative D would pass within 0.5 mile of potential nesting habitats in those riparian zones in both states compared to 85.0 miles for Alternative B and 58.5 miles for Alternative C.

Raptors nesting within 0.25 mile of the right-of-way are most likely to be adversely affected by short-term construction impacts during the nesting season. In South Dakota, there are 3 red-tailed hawk nests within 0.25 mile of Alternative D. In Wyoming, there are 6 red-tailed hawk nests, 3 golden eagle nests, 2 great horned owl nests, 1 Swainson's hawk nest and 25 ferruginous hawk nests within that distance. Since raptor nesting data for Alternative D is incomplete, there are probably more nest sites within 0.25 mile of the existing tracks in South Dakota and Wyoming. However, birds nesting within that distances of existing railroads are probably somewhat habituated to train traffic and noise, especially in Wyoming where Alternative D would follow an existing high traffic volume route.

4.4.10.3 Aquatic and Fisheries

There are no trout fisheries within the proposed project area. Warm water game fish species (largemouth bass, catfish, sunfish) as well as those preferring cooler water (walleye, pike) are present mostly in South Dakota due to their being more perennial streams and rivers. Many of these species are tolerant of the relatively high turbidity that periodically occurs in these streams and the Cheyenne River and also are tolerant of low flows in the river and perennial streams during drought years. Because of frequent limited flows below Angostura Reservoir, channel catfish are the principal recreational fishery in the Cheyenne River below the Angostura Dam (USFWS, 1993a). Short-term increases in TSS and turbidity, similar to those that could be expected during construction of this project, would likely have little affect on existing fisheries. However, increased sedimentation could lead to reduction in spawning habitat, resulting in reduced reproduction and populations of fish species present. Spills of hazardous materials during construction could reduce water quality and contribute to loss of fish and other aquatic life. Such impacts would be unlikely unless they occur in a perennial stream during a low or no-flow period thereby potentially having a local impact. As large amounts of hazardous materials are not expected to be present at construction sites and any flow would quickly dilute the small quantities released, no impacts are anticipated from spills.

Degradation to water quality by erosion and/or discharge of hazardous materials would be a significant impact to the Angostura Reservoir fishery. Additionally, significant increases in sedimentation of the Reservoir due to increased erosion during project construction could reduce fish habitat. These impacts are not anticipated due to the minimal construction along the Cheyenne River (only a few miles) upstream of the Reservoir and the distance (over 10 miles) the construction would occur from the Reservoir.

During rail line operation, impacts to fisheries and other aquatic resources would primarily result from a release of hazardous materials into a stream or river or a spill of coal. These impacts would most likely result in the unlikely event of a derailment at or adjacent to a perennial drainage. Fuel or other petroleum products could be spilled, but would likely only impact the immediate area of the spill due to limited amounts being present. While coal is not considered hazardous, in the event loaded rail cars spill into a perennial drainage, an increase in TSS could occur. This increase would only be temporary, as most of the coal would be of the size to settle to the bottom and not be carried off by stream flow.

Alternative B (Proposed Action)

There are 177 total sites where Alternative B is within 500 feet of the Cheyenne River and perennial tributary streams in South Dakota and Wyoming. Alternative B would pass within 500

feet of these drainages for a total of 21.9 miles. Alternative B would cross 20 perennial and 623 intermittent streams. These sites are believed to be those most likely for sediments and/or accidentally released toxic compounds to be discharged into the Cheyenne River system, both in the short- and long-term.

Alternative C (Modified Proposed Action)

There are 206 total sites (29 more than Alternative B) where Alternative C is within 500 feet of the Cheyenne River and perennial tributary streams in South Dakota and Wyoming. Alternative C would pass within 500 feet of these drainages for a total of 20.8 miles. Alternative C would have 14 perennial and 520 intermittent stream crossing. These sites are believed to be those most likely for sediments and/or accidentally released toxic compounds to be discharged into the Cheyenne River system, both in the short- and long-term.

Alternative D (Existing Corridors Alternative)

There are 76 total sites (101 fewer than Alternative B and 130 fewer than Alternative C) where Alternative D is within 500 feet of the Cheyenne River and perennial tributary streams in South Dakota and Wyoming. Alternative D would pass within 500 feet of these drainages for a total of 13.5 miles, less than the other alternatives. Alternative D would cross 68 perennial and 707 intermittent streams. These sites are believed to be those most likely for sediments and/or accidentally released toxic compounds to be discharged into the Cheyenne River system, both in the short-term and long-term.

4.4.10.4 Sensitive, Threatened, and Endangered Species

Potential impacts to Federally listed endangered or threatened species, species proposed for listing, candidate species, and species with special status recognized by the USFWS could include:

- The death of individuals of the species.
- Reduced recruitment and/or survival of individuals, slowing the species' recovery or expansion of current populations.
- Loss of Federally designated critical habitats.
- Loss of known habitat.
- Contributing to other causes of species decline resulting in an unlisted species, particularly a candidate or species of concern, warranting consideration for or being proposed for listing as Federally threatened or endangered.

Impacts on Federally listed species were considered and evaluated if the species potentially occurs in the vicinity of any proposed alternative. The species would be considered potentially impacted by the project if any alternative could result in:

- Direct mortality of individuals.
- Long-term or permanent loss or alteration of existing or potential habitat necessary for the life history functions (breeding, wintering, or migration) of one or more threatened or endangered species.

4.4.10.4.1 Black-Footed Ferret

Because there is no recent documented evidence that ferrets presently occur within the proposed project area it is unlikely that any of the Extension Alternatives would impact existing populations of ferrets. However, Alternative B would cross 4.9 miles of prairie dog colonies, north of a proposed black-footed ferret reintroduction site at the Rosecrans Reintroduction Area on TBNG. The presence of an operating rail line and the potential danger of mortality to any introduced ferrets could make this site unsuitable for reintroduction of the species. As suitable reintroduction sites for ferrets are becoming less available due to development, construction, and operation of Alternative B across this area could jeopardize recovery efforts to establish a sufficient number of wild ferret populations to allow the species to maintain itself.

4.4.10.4.2 Piping Plover

Construction impacts would include noise disturbance and increased human activity that could affect nesting piping plovers. Increased stream turbidity and sedimentation and spills of petroleum products such as diesel fuels or lube oils during construction of the proposed project could affect aquatic invertebrates which piping plovers rely on for their food source. Construction along the Cheyenne River during spring and early summer could displace piping plovers if they select sandbars or islands within the river to nest. During operation, noise from trains disturbing nesting piping plovers would be the most likely impact. Should spills of hazardous materials occur, they could also affect piping plovers, similar to those affects possible from a spill during construction.

The possibility of an increase in predators may lead to a relatively high risk of nest predation for nests in the vicinity of the rail line compared to those further removed (Reeve 1990, Hein & Andelt 1996). Additionally, long-term impacts to piping plovers may include noise and nest disturbance from increased human activity.

The distance that the right-of-way for the Extension Alternatives would be within 0.5 mile and 1.0 mile and the number of locations and total distance where Alternative B would be within 500 feet of the Cheyenne River and its perennial tributaries in South Dakota and Wyoming provide some indication of the level of impact construction could have to piping plovers.

Alternative B (Proposed Action)

Approximately 112.0 miles of Alternative B would be within 1.0 mile of a perennial stream, 74.0 miles would be within 0.5 mile, and 19.1 miles would be within 500 feet of a perennial stream. Alternative B would cross 20 perennial and 623 intermittent streams and convert over 62.1 acres of wetland to rail line right-of-way.

Alternative C (Modified Proposed Action)

Approximately 81.0 miles of Alternative C would be within 1.0 mile of a perennial stream or river, 50.0 miles would be within 0.5 mile, and 24.3 miles would be within 500 feet of these. Alternative C would have 14 perennial and 520 intermittent stream crossing and convert 62.2 acres of wetland to rail line right-of-way.

Alternative D (Existing Corridors Alternative)

Approximately 46.0 miles of Alternative D would be within 1.0 mile of a perennial stream or river, 30.0 miles would be within 0.5 mile, and 13.5 miles would be within 500 feet of these. Alternative D would cross 68 perennial and 707 intermittent streams and convert 40.7 acres of wetland to rail line right-of-way.

4.4.10.4.3 Interior Least Tern

Because Interior least terns utilize similar habitat and have similar life histories to piping plovers (Section 4.1.10), the potential impacts to terns from the Extension Alternatives would be similar to those described in Section 4.4.12.2 for piping plovers. The exception would be that terns appear somewhat tolerant of distant noises, such as highway traffic, and may not be disturbed from nesting in suitable habitat by either construction or operation of the alternatives.

4.4.10.4.4 Pallid Sturgeon

Suitable habitat does not exist in the vicinity of any of the Extension Alternatives. Therefore, this species would not be affected by their construction and operation.

4.4.10.4.5 American Burying Beetle

American burying beetle habitat may be disturbed or lost during construction and operation of the rail line. Most likely are impacts due to construction, such as removal and compaction of soils, but only if beetles are present within construction right-of-way. Once the ballast is laid and the earth compacted in the right-of-way it is unlikely these areas would be suitable habitat for the beetle. Impacts due to artificial lights, which are known to attract and disorient many species of nocturnal insects, could occur due to lighting during nighttime and evening construction and from security lighting.

Alternative B (Proposed Action)

Though not documented in the vicinity of Alternative B in South Dakota, American burying beetles could occur in suitable soils. There are approximately 32.4 miles (approximately 1,570.9 acres) in South Dakota where Alternative B would pass through soils and habitats that might be used by American burying beetles.

Alternative C (Modified Proposed Action)

Impacts would be similar to those for Alternative B. There are approximately 34.3 miles, (approximately 1,663.0 acres) in South Dakota where Alternative C would pass through suitable soils in potential habitats that might be used by American burying beetles. However, nearly 22.1 miles of Alternative C passes through soils with characteristics to be prime farmlands. If these lands are irrigated and/or cultivated, they would not be suitable habitat for the beetle.

Alternative D (Existing Transportation Corridors)

Construction of this alternative would have similar impacts as Alternatives B and C. However, this alternative passes through more miles of potential habitat. There are approximately 39.4 miles (approximately 955.1 acres) in South Dakota where Alternative D would pass through suitable soils in potential habitats that might be used by American burying beetles. Approximately 38.6 miles of Alternative D passes through soils with characteristics to be prime farmlands, but whether all or some are irrigated and/or cultivated is unknown.

4.4.10.4.6 Ute Ladies'-tresses Orchid

Loss of existing populations or portions of populations of Ute Ladies'-tresses orchid and loss of suitable habitat during construction would be the primarily impacts of construction and operation of the proposed alternatives. Spills of hazardous materials during construction and

operation and herbicide application to control vegetation during operation could damage or destroy populations of this orchid outside the right-of-way.

Alternative B (Proposed Action)

As a result of a survey conducted by SEA, two sites along Alternative B have been identified as potential habitat for Ute ladies'-tresses, one site in South Dakota (Dry Creek) and one site in Wyoming (Lodgepole Creek). Alternative B would cross a total of 33.2 acres of wet meadows and palustrine emergent wetland temporarily and seasonally flooded, considered to be suitable habitat for this orchid.

Alternative C (Modified Proposed Action)

There are three sites along Alternative C that SEA identified as potential habitat for Ute ladies'-tresses, one site in South Dakota (Dry Creek) and two sites in Wyoming (Lodgepole Creek and School Creek). In South Dakota, Alternative C would cross a total 39.2 acres of wet meadows and palustrine emergent wetland temporarily and seasonally flooded habitat.

Alternative D (Existing Transportation Corridors)

There is one site along Alternative D that SEA identified as potential habitat for Ute ladies'-tresses. The site is at the crossing of Dry Creek in South Dakota where Alternative D and Alternative C follow the same alignment. In South Dakota, Alternative D would cross a total of 26.4 acres of wet meadows and palustrine emergent wetlands that are temporarily and seasonally flooded, that could be potential habitat for the orchid.

4.4.10.4.7 Bald Eagle

Construction of Extension Alternatives during winter within the TBNG and along the corridor of the Cheyenne River in South Dakota and its major tributaries in Wyoming is likely to displace wintering bald eagles from perches and feeding areas or make those sites temporarily unsuitable. Noise from blasting and the operation of heavy earthmoving equipment and other activities associated with construction and preparation of the rail bed could potentially disturb bald eagles. However, construction activities during the winter would be limited to placement of culverts and bridges throughout the project area. Bald eagles would only be disturbed by these activities if they occurred in the vicinity of roosting, perching, or feeding areas during periods when eagles were present. Because bridge and culvert construction at any location would be short-term, taking only a few days, eagles disturbed at a location could return within a short time due to construction activities relocating. Any disturbance would be most significant during severe

weather as it would unnecessarily stress individuals, potentially leading to their loss. These periods would likely be inappropriate for construction and work would cease. Therefore, during these critical times, it would be unlikely construction activities would occur and disturb wintering eagles. Should weather conditions allow the construction season to extend into the fall and winter months or begin earlier than normally expected in the spring, wintering eagles could be disturbed by rail line construction. However, if the weather is suitable for such construction, eagles may not be present, having lingered in more northern areas or returned to them early due to good weather. Any eagles that would remain would likely have abundant areas for use as other eagles that may have been competitors for food and roosting space would not be present. Some trees suitable as bald eagle winter roost sites or future nesting sites could be removed during rail line construction, resulting in these areas no longer being available for eagle use.

Once the rail line is operational, disturbances to wintering bald eagles could occur because of train noise and increased human activity. Since wintering bald eagles in some areas feed on big game carrion, they sometimes suffer direct mortalities when struck by vehicles while feeding at roadsides. Similar impacts could result from eagles being hit by trains if they are feeding on carrion along the rail line. Such mortality would be most likely to young birds unskilled at finding food and during severe weather when big game may be more susceptible to being hit by trains and other eagle food sources would be scarce.

Alternative B (Proposed Action)

Approximately 78.5 miles and 118.0 miles of Alternative B would be within 0.5 and 1.0 miles, respectively, of potential bald eagle wintering habitat. Alternative B would result in the loss of 130.9 acres of woodland habitat, potentially providing roosting and nesting areas.

Alternative C (Modified Proposed Action)

Approximately 57.4 miles of Alternative C passes within 0.5-mile of potential bald eagle winter habitats in South Dakota and Wyoming. Almost 89.8 miles of Alternative C would be within 1.0 mile of potential bald eagles wintering habitats. Alternative C would result in the loss of approximately 193.8 acres of woodland habitat.

Alternative D (Existing Transportation Corridors)

Nearly 29.9 miles of Alternative D passes within 0.5-mile of potential bald eagle winter habitats in South Dakota and in Wyoming. If construction and operation related disturbances affected wintering bald eagles up to 1.0 mile away, almost 45.1 miles of Alternative D would be within that distance from potential habitats. Specifically in South Dakota, Alternative D would

affect less potential habitats along the Cheyenne River than Alternative B or C. Alternative D would result in the loss of approximately 237.5 acres of woodlands potentially used by eagles.

4.4.10.4.8 Mountain Plover

Since mountain plovers nest on the ground, adult birds, eggs and young may be susceptible to mortality by vehicles and construction equipment, especially along 2-track range roads and undeveloped areas during construction. Noise disturbance and human activity during construction could also displace mountain plovers from nesting near construction sites. Grassland habitat, particularly areas with prairie dog towns, provide nesting habitat for mountain plovers and construction through these areas would result in the conversion of potential nesting habitat to rail line right-of-way.

During operation, mountain plovers may avoid areas within and adjacent to the rail line right-of-way due to noise disturbance. However, if DM&E maintains a fire break along the rail line and within the right-of-way, the open ground may appear similar to prairie dog colonies and attract mountain plover to nest. The adults, eggs, and chicks could be susceptible to mortality during rail line maintenance activities should these occur during the nesting season. Some mortality to chicks may occur if they wander onto the rail line.

Alternative B (Proposed Action)

Alternative B would pass through approximately 92.4 miles of grasslands (approximately 4,480 acres) in South Dakota and approximately 128.0 miles (approximately 6,206.1 acres) in Wyoming that SEA considers potential nesting habitat that would be converted to railroad right-of-way. Additionally, there are 3.4 miles (approximately 164.5 acres) of prairie dog colonies in South Dakota and 8.1 miles (392.7 acres) that are considered potential nesting habitat that would be converted to railroad right-of-way.

Alternative C (Modified Proposed Action)

There are 106.7 miles of grasslands (approximately 5,173.3 acres) in South Dakota and 110.3 miles (approximately 5,347.9 acres) in Wyoming that SEA considers potential nesting habitat that would be converted to railroad right-of-way. Additionally there is 5.1 miles (approximately 247.3 acres) of prairie dog colonies in South Dakota and 12.4 miles (approximately 601.2) in Wyoming that are considered potential nesting habitat that would be converted to railroad right-of-way.

Alternative D (Existing Transportation Corridors)

Alternative D would pass through 119.2 miles (approximately 2,889.6 acres) of grasslands in South Dakota and 110.3 miles (approximately 5.347.9 acres) in Wyoming that are considered potential nesting habitat that would be converted to railroad right-of-way. Additionally, there are 2.9 miles (approximately 24.3 acres) of prairie dog colonies in South Dakota and 3.3 miles (approximately 80.0 acres) that are considered potential nesting habitat that would be converted to railroad right-of-way.

4.4.10.4.9 Swift Fox

Swift fox are probably found using all upland habitats in the vicinity of the proposed project in South Dakota and Wyoming. However, they are more at risk where the proposed project would cross prairie dog colonies. Additional habitat outside the right-of-way may be unsuitable due to human activity and noise during construction. Removal of vegetation from the project area may reduce prey species and potential swift fox habitat. This species is occasionally killed by vehicular traffic, which has been estimated as contributing 5 percent of annual swift fox mortality. Therefore, increased construction vehicle traffic could increase mortality. Swift foxes do consume carrion (Samuel and Nelson 1982, Uresk and Sharps 1986, Scott-Brown et al. 1987) and so are vulnerable to being struck by trains if they feed on carcasses along the rail line once it is operational.

Alternative B (Proposed Action)

There are 11.5 miles (approximately 557.5 acres) of prairie dog colonies in South Dakota and Wyoming that would be converted to railroad right-of-way for construction of Alternative B.

Alternative C (Modified Proposed Action)

Alternative C would result in 17.5 miles (approximately 848.5 acres) of prairie dog colonies in South Dakota and Wyoming that would be converted to railroad right-of-way.

Alternative D (Existing Transportation Corridors)

There are 6.2 miles (approximately 150.3 acres) of prairie dog colonies in South Dakota and Wyoming that would be converted to railroad right-of-way during construction of Alternative C.

4.4.10.4.10 Sturgeon Chub

Sturgeon chub appear susceptible to increased sedimentation that could occur as a result of construction of the proposed project. Further, changes in stream flow due to bank stabilization could alter, degrade, or eliminate downstream habitats. These impacts are unlikely due to the few and scattered crossings of the Cheyenne River by the Extension Alternatives. Accidental releases of petroleum products into the Cheyenne River during construction or operation could reduce or eliminate populations of sturgeon chub. Again, these impacts are unlikely due to the limited quantities of such materials available to be spilled and the flow in the Cheyenne River able to quickly dilute these small amounts to unharmful concentrations.

Alternative B (Proposed Action)

There are 177 total sites where Alternative B is within 500 feet of the Cheyenne River and perennial tributary streams. Alternative B would pass within 500 feet of these drainages for a total of 19.1 miles. Alternative B would cross 20 perennial streams and 623 intermittant stream. In South Dakota, it would cross 14 perennial streams, including 3 crossings of the Cheyenne River and 208 intermittent streams. In Wyoming, this alternative would cross 6 perennial streams and 415 intermittent streams.

Alternative C (Modified Proposed Action)

There are 206 sites on the Cheyenne River and perennial tributary streams, combined, where Alternative C is within 500 feet of the drainages. Approximately 20.8 miles of Alternative C is within 500 feet of the Cheyenne River and tributaries. Alternative C would cross 14 perennial streams and 520 intermittent streams. In South Dakota, this alternative would cross 10 perennial streams, including 3 crossings of the Cheyenne River and 230 intermittent streams. In Wyoming, this alternative would cross 4 perennial streams and 290 intermittent streams.

Alternative D (Existing Transportation Corridors)

There are 76 sites on the Cheyenne River and perennial tributary streams, combined, where Alternative D is within 500 feet of the drainages. Less than 13.5 miles of Alternative D is within 500 feet of the Cheyenne River and tributaries. Alternative D would cross 68 perennial and 707 intermittent streams. In South Dakota, Alternative D would cross 45 perennial streams and 312 intermittent streams. Alternative D would cross the Cheyenne River twice in South Dakota. In Wyoming, this alternative would cross 23 perennial streams and 395 intermittent streams.

4.4.10.4.11 Black-tailed Prairie Dog

Locations of prairie dog colonies along each alternative were obtained from a variety of sources. These included colonies mapped by WGFD during the late 1980's which are not current. Because accurate, current mapping is not available and colonies are abandoned, die off, and start new continually, it is difficult to determine the exact amount of prairie dog habitat crossed by the Extension Alternatives.

Direct impacts to black-tailed prairie dogs are most likely to occur during the construction phase of the project if the animals occur in the right-of-way. Destruction of burrows and loss of individuals would likely occur from earthmoving activities. Colony habitat within the right-of-way would be lost, although prairie dogs may recolonize portions of the right-of-way. Long-term impacts include fragmentation of the black-tailed prairie dogs' habitat, increased mortality from passing trains due to prairie dogs moving around the colony and across the rail line and potentially disease occurrence due to disease being spread between colonies along the rail line.

Alternative B (Proposed Action)

At least 11.4 miles (approximately 552.7 acres) of alternative B would pass through prairie dog colonies in South Dakota and Wyoming.

Alternative C (Modified Proposed Action)

At least 16.9 miles (approximately 819.4 acres) of Alternative C would pass through prairie dog colonies in South Dakota and Wyoming.

Alternative D (Existing Transportation Corridors)

At least 6.2 miles (approximately 150.3 acres) of Alternative D would pass through prairie dog colonies in South Dakota and Wyoming.

4.4.11 TRANSPORTATION

All of the Extension Alternatives would likely impact transportation throughout the project area. Impacts would include:

- Increased vehicle traffic volume on area highways and roads.
- Accelerated deterioration of public road surfaces due to increased vehicle traffic.
- Increased road maintenance requirements due to roadway deterioration.

- Increased speeding from motorist trying to beat trains to grade crossings.
- Conflicts between rail carriers for access to the coal mines.
- Increased rail competition, potentially resulting in lower coal transportation costs.
- More efficient movement of PRB coal due to shorter routes being provided.

Sections 4.1.9 and 4.2.9 describe the transportation facilities in the project area. Construction activities would have temporary, short-term impacts on existing transportation systems, including Federal, state, county, and private roads. Rural roadways and bridges incapable of supporting construction traffic would require upgrading for safe transportation. Road crossings, both grade and grade separated, may require road closure and associated detours during construction of the crossings. Additionally, routes for emergency vehicle response would have to be redesigned to avoid closed crossing and still maintain timely response. Pedestrian traffic in communities would also need to be modified to avoid crossing closures and construction areas, potentially resulting in pedestrians walking significant distances out of their way or crossing the rail line at unauthorized locations. These temporary impacts would be limited to the two to three year construction period and would likely be limited to only the period when construction was occurring in a particular area. Once it was completed and shifted to other areas, other roadways would likely be used to access construction sites. These impacts would include increased traffic and congestion on roadways due to the transportation of materials and crews to work sites. Transportation of materials in heavy trucks and movement of construction equipment could accelerate wear and tear on local roadways not designed to handle the level of traffic or weight of construction vehicles. Rural roadways and bridges incapable of supporting construction traffic would require upgrading for safe transportation. Delays or detours may be required during construction of grade crossings, resulting in inconvenience to motorists.

Construction activities could impact rail traffic, both on the existing DM&E system and the systems of other rail carriers. However, DM&E has indicated that rail line reconstruction, such as that necessary for the existing rail line portion of Alternative D, would occur in such a manner as to maintain rail service along the rail line. Some delays to trains may occur but no significant impacts are anticipated. Additionally, construction of the DM&E rail line could impact rail operations of other rail carrier due to both delays in DM&E traffic to be interchanged and construction of rail/rail crossings or in proximity to other rail lines. Should DM&E experience train delays due to construction, interchanging rail carriers could also experience delays due to crews waiting for trains and rail schedules being impacted. While some impacts would likely occur, they should not significantly impact the overall operations, local, regional, or nationwide, of interchanging rail carriers. During construction of new crossings of other rail carriers or construction in close proximity to their rail lines, trains using these crossing or section of rail line may be delayed or need to be rerouted to avoid the areas. Coordination between the railroads would be imperative to maintain safe rail operations and allow construction activities to occur in a

manner least disruptive to either railroad. Again, some impacts are expected, although they are not expected to be significant.

During operation, new grade crossings would result in motorist delays due to trains periodically blocking grade crossings. To analyze the effects of the increased traffic on delays at existing highway/rail crossings, SEA identified roadway grade crossing for which the average daily traffic (ADT) would exceed 5,000 vehicles. SEA then calculated potential vehicle delay at these crossings. In order to analyze the effects of the proposed construction on the roadway system at new public highway/railroad at-grade crossing locations, SEA analyzed the crossings for all three proposed levels of operation; 20 MNT, 50 MNT and 100 MNT for train lengths of both 6,400 feet (115 rail cars plus locomotives) and 7,400 feet (135 rail cars plus locomotives). SEA concluded that the potential effect of train traffic for highways with ADT volumes below 5,000 would be experienced by very few drivers and the vehicular delay (estimated to be minutes for trains traveling 45 mph) and number of vehicles delayed per train passing event would be minimal. Only Alternative D would have grade crossings with ADTs of 5,000 vehicles per day or greater, all of which would be in Pennington County, South Dakota. SEA categorized crossing based on the level of service. Levels of service ranged from free-flowing to severely congested and were quantified as follows:

Table 4.4-40
Grade Crossing Levels of Service

Level of Service	Average Total Delay (sec/vehicle)
A	≤5
B	>5 and ≤10
C	>10 and ≤20
D	>20 and ≤30
E	>30 and ≤ 45
F	>45

As part of the transportation analysis, SEA determined the time each crossing would be blocked per train crossing event. This time included the time for the train to pass along with time for warning structures to be deployed and restored after the train passed. Because train passing time is dependent on train speed and trains would generally be operating at speeds ranging from 45 to 49 miles per hour, SEA conservatively used 45 miles per hour for all calculations

concerning vehicle delay. Blocked crossing time per train was calculated to be 2.1 minutes for 115-car trains and 2.4 minutes for 135-car trains. SEA determined significant impact to traffic from the project would result from an average 30-second increase in vehicle delay or level of service rated E or F (regardless of the existing condition). Additionally, a reduction of existing level of service of C or better to a level of D or worse due to the project would result in a significant impact. The detailed description of levels of service and criteria of significance are included in Appendix G , "Traffic and Transportation." The results of SEA's delay calculations are provided below.

Because much of the area has wide viewsheds, motorists would likely see trains approaching grade crossing and may increase their vehicle speed to try and beat the train to the crossing in order to avoid being delayed. Operation of a new rail providing access to the PRB mines would also provide the opportunity for operational conflicts between the different railroads. These conflicts would primarily be related to access to the mines, where a train from one railroad would be required to wait for another railroad's train to finish loading and exit the mine rail loading loop before it could enter and be loaded. However, an additional rail carrier, operating over a largely different route, would provide competition between rail carriers for transport of PRB coal. Such competition would likely cause a reduction in rail transportation rates and require rail carriers to become more efficient in order to be more competitive. Transportation of PRB coal could also become more efficient due to shorter routes for its transport being available.

Alternative B (Proposed Action)

Alternative B would have 44 new grade crossings of public roads, 30 in South Dakota and14 in Wyoming. None of these crossings would have ADT's greater than 5,000. Therefore, SEA did not calculate vehicle delay for these crossings.

Alternative C (Modified Proposed Action)

Alternative C would have 45 new grade crossings of public roads, 29 in South Dakota and 16 in Wyoming. None of these crossings would have ADT's greater than 5,000. Therefore, SEA did not calculate vehicle delay for these crossings.

Alternative D (Existing Transportation Corridors)

Alternative D would have 10 new grade crossings of public roads, all in South Dakota, and affect 98 existing public grade crossings along the portion of this alternative that uses the existing DM&E rail line (56 crossings) and parallels the existing BNSF rail line (42 crossings). Three of these crossings would have ADT's greater than 5,000. SEA calculated potential values

of vehicle delay at those crossings where average daily traffic (ADT) volumes are 5,000 or greater. The description of levels of service and criteria of significance has been addressed in Appendix C, "Traffic and Transportation."

Pennington County

20 MNT

There are three public grade crossings in Pennington County with ADT's above 5,000 for which SEA conducted vehicle delay calculations. The three crossings include the East Boulevard crossing (Mile post 99.9), the Maple Avenue crossing (Mile post 99.5), and E. Saint Patrick Street (Mile post 98.3). All three crossing are on the existing DM&E rail line and would experience a reduction in delay per stopped vehicle due to increased train speeds. The level of service under this alternative would be A for both train length scenarios. The crossing would also experience a reduction in maximum vehicle queue length.

50 MNT

All three crossings would experience a reduction in delay per stopped vehicle. The level of service under this alternative would be A for the 6,400-foot train scenario and B for the 7,400-foot train scenario. The crossings would also experience a reduction in maximum vehicle queue length.

100 MNT

All three crossings would experience a reduction in delay per stopped vehicle. The level of service under this alternative would be B for both train length scenarios. The crossings would also experience a reduction in maximum vehicle queue length.

Emergency Vehicle Response

Construction and operation of any of the Extension Alternatives would likely require police, fire, and emergency medical services (EMS), or ambulance, to periodically cross the rail line when responding to an emergency. These crossings would be expected to occur most often on public roads. However, due to the rural nature of the area and limited access to many areas, emergency vehicles may also cross the rail line at private crossing, particularly to access a fire. In some instances, the rail line right-of-way may provide a suitable travel route that would also be the shortest and most direct access to an emergency, providing better access than established roadways.

Although the rail right-of-way could provide access for emergency vehicles to rural emergencies, it would also provide an opportunity for emergency to be delayed by a passing train when required to cross the rail line. As discussed in Section 4.3.12, the further a emergency is from emergency services, the more significant the emergency can become. In the case of a fire, increased distance increases response time, potentially leading to greater damage. In a medical emergency, particularly one that is life-threatening, increased response time increased distance from a hospital increases the need for timely EMS treatment. In both cases, added time from delays at grade crossings could prove significant, particular in this rural area with limited access. However, few roads, with little traffic would be crossed by the Extension Alternatives. This combined with the low population of the area reduce the frequency at which emergencies would be expected to occur. Because train passing events and emergencies are random events that are independent of each other, as discussed in Section 4.3.12, it is not possible to predict the potential for an emergency vehicle, responding to a life-threatening emergency, to be blocked by a passing train. While it is possible for such an incident to occur with potentially significant adverse impacts, such as property damage from a fire or loss of life, such incidents are anticipated by SEA to be unlikely.

Because much of the area has wide viewsheds, motorists would likely see trains approaching grade crossing and may increase their vehicle speed to try and beat the train to the crossing in order to avoid being delayed. Operation of a new rail providing access to the PRB mines would provide the opportunity for operational conflicts between the different railroads. These conflicts would primarily be related to access to the mines, where a train from one railroad would be required to wait for another railroad's train to finish loading and exit the mine rail loading loop before it could enter and be loaded. However, an additional rail carrier, operating over a largely different route, would provide competition between rail carriers for transport of PRB coal. Such competition would likely cause a reduction in rail transportation rates and rail carriers to become more efficient in order to be more competitive. Transportation of PRB coal could also become more efficient due to shorter routes for its transport being available.

4.4.12 SAFETY

The proposed project has the potential to impact vehicle safety at grade crossings, pedestrian safety at designated crossings, along the rail line, and train safety. These impacts could occur during both construction and operation of the project.

During construction at grade crossings, delays and detours for vehicles could occur. Motorists using these crossings could become frustrated with these conditions and try to cross during construction, beat trains to avoid delay at other grade crossings, or increase speeds along detour routes. These actions, combined with increased traffic congestion along detour routes

could result in unsafe conditions for motorists and pedestrians, potentially leading to increased vehicle/vehicle and vehicle/pedestrian accidents.

Pedestrians in communities through which the alternatives (particularly Alternative D) pass may also become frustrated with increased inconvenience from walking further distances and cross the rail line at closed crossings, walk along the rail line right-of-way, or cross at unauthorized locations. These actions could result in injury to pedestrians from construction related activities. Additionally, the presence of construction equipment and materials would likely be attractive to children and adolescents who could be injured playing around construction sites.

During construction, rail safety would be a continual concern. Construction activities could damage the track or incomplete construction could lead to derailments. Prior to operation of trains following construction activities, rail bed and track should be inspected for defects to help reduce the likelihood of derailments. Construction workers within the right-of-way could be injured by passing trains or flying debris, particularly in areas near other carriers' rail lines. Appropriate coordination between construction and trains crews would be important to maintain a safe working environment.

Train activity during operation could affect the safety of roadway users at highway/rail grade crossings. To address potential changes in accident frequency, SEA determined accident frequency rates at all public highway/rail grade crossings that would be affected by the Extension Alternatives. At existing grade crossings (such as those along Alternative D), SEA looked at the most recent five years of accident history available and calculated the potential change in the number of years between accidents. SEA's analysis procedure considered the type of existing warning devices at the highway/rail grade crossings, including passive devices (signs or crossbucks), flashing lights, or gates.

To evaluate the significance of potential changes in accident frequency along affected grade crossings in South Dakota and Wyoming, SEA categorized highway/rail grade crossings into two categories:

Category A

Category A consists of highway/rail grade crossings with relatively frequent train vehicle accidents predicted. SEA considered highway/rail grade crossings in South Dakota with accident frequency rates at or above the state's 50th highest accident frequency rate of one accident every 20 years (0.051 accident frequency rate) to be Category A highway/rail grade crossings. SEA considered highway/railroad grade crossings in Wyoming with accident frequency rates at or above the states 50th highest accident frequency rate of one accident every 40 years (0.025

accident frequency rate) to be Category A highway/rail grade crossings. For all Category A highway/rail grade crossings, SEA considered the relatively small accident frequency rate increase of one accident every 100 years (a 0.01 accident frequency rate increase) to be significant.

Category B

Category B consisted of highway/rail grade crossings with relatively few train vehicle accidents predicted. SEA considered highway/rail grade crossings in South Dakota with accident frequency rates less than one accident every 20 years (less than 0.051 accident frequency rate) to be Category B highway/rail grade crossings. SEA considered highway/rail grade crossings in Wyoming with accident frequency rates lass than one accident every 40 years (less than 0.025 accident frequency rate) to be Category B highway/railroad grade crossings. For these crossings, SEA considered an accident frequency rate increase of one accident every 20 years (a 0.05 accident frequency rate increase) to be significant.

Increased train activity could potentially affect the safety of roadway users at locations where the rail line crosses the roadway. SEA evaluated the accident potential along each of the Extension Alternatives in South Dakota and Wyoming at locations where the railroad tracks cross public roadways grade. SEA did not analyze grade-separated crossings because these crossings eliminate the potential for train vehicle accidents by physically separating the roadway from the railroad track. Appendix H includes the results of SEA's analysis. A summary of SEA's county by county analysis is presented below.

Alternative B (Proposed Action)

The county analysis includes all crossings along the proposed Alternative B alignment except those along the proposed Spring Creek Segment, Phiney Flat Alternative, Hay Canyon Segment, WG Divide Alternative and Oral Segments. The crossings along these Alternative B segments are analyzed separately under the preceeding headings of this Section.

Pennington County

20 MNT

SEA's safety analysis showed that for the 6 public highway/railroad grade crossings proposed for Alternative B, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.022. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 45 years, respectively. The proposed crossings in Pennington County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.029. This translates into a range of estimated annual accident frequency from one accident every 90 years to one accident every 35 years, respectively. The proposed crossings in Pennington County are all classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.035. This translates into a range of estimated annual accident frequency from one accident every 68 years to one accident every 28 years, respectively. The proposed crossings in Pennington County are all classified as Category B.

Custer County

20 MNT

SEA's safety analysis showed that for the 2 public highway/railroad grade crossings proposed for Alternative B, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.029. This translates into a range of estimated annual accident frequency from one accident every 122 years to one accident every 34 years, respectively. SEA found these predicted rates to be below the criteria for significance. The proposed crossings in Custer County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.039. This translates into a range of estimated annual accident frequency from one accident every 88 years to one accident every 26 years, respectively. The proposed crossings in Custer County are all classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.048. This translates into a range of estimated annual accident frequency from one accident every 66 years to one accident every 21 years, respectively. The proposed crossings in Custer County are all classified as Category B.

Fall River County

20 MNT

SEA's safety analysis showed that for the 22 public highway/railroad grade crossings proposed for Alternative B, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.031. This translates into a range of estimated annual accident frequency from one accident every 122 years to one accident every 32 years, respectively. The proposed crossings in Fall River County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.041. This translates into a range of estimated annual accident frequency from one accident every 91 years to one accident every 25 years, respectively. The proposed crossings in Fall River County are all classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.050. This translates into a range of estimated annual accident frequency from one accident every 67 years to one accident every 20 years, respectively. The proposed crossing at Old U. S. Highway 18, MP 716.50 is classified as Category A. All other proposed crosings in Fall River County are classified as Category B.

Niobrara County

20 MNT

SEA's safety analysis showed that for the 3 public highway/railroad grade crossings required for Alternative B, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.023. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 43 years, respectively. The proposed crossings in Niobrara County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.030. This translates into a range of estimated annual

accident frequency from one accident every 91 years to one accident every 33 years, respectively. The proposed crossing at US Highway 85, MP 741.20 is classified as Category A. All other proposed crossings in Niobrara County are classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.037. This translates into a range of estimated annual accident frequency from one accident every 66 years to one accident every 27 years, respectively. The proposed crossing at US Highway 85, MP 741.20 is classified as Category A. All other proposed crosings in Niobrara County are classified as Category B.

Weston County

20 MNT

SEA's safety analysis showed that for the 5 public highway/railroad grade crossings proposed for Alternative B, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.010. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 100 years, respectively. The proposed crossings in Weston County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.014. This translates into a range of estimated annual accident frequency from one accident every 91 years to one accident every 71 years, respectively. The proposed crossings in Weston County are all classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.019. This translates into a range of estimated annual accident frequency from one accident every 66 years to one accident every 53 years, respectively. SEA found the predicted rates to be below the criteria for significance.

Campbell County

20 MNT

SEA's safety analysis showed that for the 6 public highway/railroad at-grade crossings proposed for Alternative B, the predicted accident frequency at the 20 MNT level of operation would range from 0.006 to 0.034. This translates into a range of estimated annual accident frequency from one accident every 167 years to one accident every 29 years, respectively. SEA found the predicted rates to be below the criteria for significance. The proposed crossing at Highway 450, MP 781.00 is classified as Category A. All other proposed crossings in Campbell County are classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.008 to 0.044. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 23 years, respectively. The proposed crossings at Highway 450, MP 781.00 and Bishop Road, MP 828.70 are classified as Category A. All other proposed crossings in Campbell County are classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.011 to 0.054. This translates into a range of estimated annual accident frequency from one accident every 91 years to one accident every 19 years, respectively. The proposed crossings at Highway 450, MP 781.00 and Bishop Road, MP 828.70 are classified as Category A. All other proposed crossings in Campbell County are classified as Category B.

Alternative C (Modified Proposed Action)

The county analysis includes all crossings along the proposed Alternative C alignment except those along the proposed Spring Creek Segment, Phiney Flat Alternative, Hay Canyon Segment, WG Divide Alternative and Oral Segment. The crossings along these segments are analyzed separately under the proceeding headings of this Section.

Pennington County

20 MNT

SEA's safety analysis showed that for the eight proposed public highway/railroad grade crossings for Alternative C, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.022. This translates into a range of estimated annual accident frequency from one accident every 125 year to one accident every 45 years. The proposed crossings in Pennington County are al classified as Category B.

50 MNT

SEA's safety analysis showed that predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.029. This translates into a range of estimated annual accident frequency from one accident every 91 years to one accident every 34 years. The proposed crossings in Pennington County are all classified as Category B.

100 MNT

SEA's safety analysis showed that for the eight proposed public highway/railroad at-grade crossings in Pennington County, the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.035. This translates into a range of estimated annual accident frequency from one accident acery 67 years to one accident every 29 years.

Custer County

20 MNT

SEA's safety analysis showed that for the two proposed public highway/railroad grade crossings in Alternative C, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.029. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 34 years. The proposed crossings in Custer County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.021. This translates into a range of estimated annual

accident frequency from one accident every 91 years to one accident every 48 years. The proposed crossings in Custer County area all classified as Category B.

100 MNT

SEA's safety analysis showed that for the, the predicted accident frequency at the 100 MNT level of operation would range from 0.011 to 0.021. This translates into a range of estimated annual accident frequency from one accident every 67 years to one accident 38 years. The proposed crossings in Custer County area all classified as Category B.

Fall River County

20 MNT

SEA's safety analysis showed that for the 19 proposed public highway/railroad grade crossings for Alternative C, the predicted accident frequency at the 20 MNT level of operation would range from 0.005 to 0.031. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 32 years. The proposed crossings in Fall river County are all classified as Category B.

50 MNT

SEA's safety analysis showed that for the 19 proposed public highway/railroad at-grade crossings in Fall River County, the highest predicted accident frequency at the 50 MNT level of operation occurs at U.S. Highway 18 (Milepost 687.40). The predicted rate is 0.020 at both locations, which corresponds to one accident every 50 years. The proposed crossings in Fall River County are all classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.024. This translates into a range of estimated annual accident frequency from once accident every 67 years to one accident every 42 years. The proposed crossings in Fall River County are all classified as Category B.

Niobrara County

20 MNT

SEA's safety analysis showed that for the 3 public highway/railroad at-grade crossings required for Alternative C, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.020. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 50 years, respectively. The proposed crossings in Niobrara County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.026. This translates into a range of estimated annual accident frequency from one accident every 88 years to one accident every 38 years, respectively. The proposed crossing at US Highway 85, MP 741.20 is classified as Category A. All other crossings in Niobrara County are classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.032. This translates into a range of estimated annual accident frequency from one accident every 67 years to one accident every 31 years, respectively. The proposed crossing at US Highway 55, MP 741.20 is classified as Category A. All other crossing in Niobrara County are classified as Category B.

Weston County

20 MNT

SEA's safety analysis showed that for the 7 public highway/railroad grade crossings required for Alternative C, the predicted accident frequency at the 20 MNT level of operation would range from 0.008 to 0.010. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 100 years, respectively. The proposed crossings in Weston County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.011 to 0.014. This translates into a range of estimated annual accident frequency from one accident every 88 years to one accident every 69 years, respectively. The proposed crossings in Weston County are all classified as Category B.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.015 to 0.019. This translates into a range of estimated annual accident frequency from one accident every 67 years to one accident every 53 years, respectively. The proposed crossings in Weston County are all classified as Category B.

Campbell County

20 MNT

SEA's safety analysis showed that for the 6 public highway/railroad grade crossings required for Alternative C, the predicted accident frequency at the 20 MNT level of operation would range from 0.006 to 0.022. This translates into a range of estimated annual accident frequency from one accident every 167 years to one accident every 45 years, respectively. The proposed crossings in Campbell County are all classified as Category B.

50 MNT

SEA's safety analysis showed that the predicted accident frequency at the 50 MNT level of operation would range from 0.008 to 0.028. This translates into a range of estimated annual accident frequency from one accident every 125 years to one accident every 40 years, respectively. The proposed crossing at Bishop Road, MP 828.70 is classified as Category A. All other crossings in Campbell County are classified as Category A.

100 MNT

SEA's safety analysis showed that the predicted accident frequency at the 100 MNT level of operation would range from 0.011 to 0.035. This translates into a range of estimated annual accident frequency from one accident every 91 years to one accident every 29 years, respectively. The proposed crossings at Wy 450, MP 794.40 and Bishop Road, MP 828.70 are classified as Category A. All other crossings in Campbell County are classified as Category B.

Alternative D (Existing Transportation Corridor)

Pennington County

20 MNT

SEA's safety analysis showed that for the 37 public highway/railroad grade crossings studied in Pennington County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.004 to 0.047. This translates into a range of increase from one accident every 269 years to one accident every 21 years, respectively. The proposed crossings at Wy 450, MP 794.40 and Bishop Road, MP 828.70 are classified as Category A. All other crossings in Campbell County are classified as Category B.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Pennington County of 0.318. This represents a predicted increase of one accident every 3 years. A total of seven accidents occurred at the at-grade crossings in the County between 1993-1997.

50 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.007 to 0.076. This translates into a range of increase from one accident every 143 years to one accident every 13 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at Baseline Road, Maple Ave., Omaha Street, 2nd Street, East Blvd., E. Saint Charles Street and E. Saint Patrick Street. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case resulting in a system-wide change in accident frequency in Pennington County of 0.599. This represents a predicted increase of one accident every 2 years.

100 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.001 to 0.099. This translates into a range of increase from one accident every 1,193 years to one accident every 10 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at

Baseline Road, Maple Ave., Omaha Street, 2nd Street, East Blvd., Steele Ave., E. Saint Charles Street, and E. Saint Patrick Street.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Pennington County of 0.880. This represents a predicted increase of one accident every year.

Custer County

20 MNT

SEA's safety analysis showed that for the 8 public highway/railroad grade crossings studied in Custer County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.005 to 0.020. This translates into a range of increase from one accident every 214 years to one accident every 49 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at U.S. Highway 40. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Custer County of 0.062. This represents a predicted increase of one accident every 16 years. No accidents occurred at the crossings in the County between 1993-1997.

50 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.008 to 0.032. This translates into a range of increase from one accident every 120 years to one accident every 31 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at U.S. Highway 40. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case resulting in a system-wide change in accident frequency in Custer County of 0.106. This represents a predicted increase of one accident every 9 years.

100 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.013 to 0.043. This translates into a range of increase

from one accident every 79 years to one accident every 23 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at U.S. Highway 40. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Custer County of 0.154. This represents a predicted increase of one accident every seven years.

Fall River County

20 MNT

SEA's safety analysis showed that for the 21 public highway/railroad grade crossings studied in Fall River County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.006 to 0.013. This translates into a range of increase from one accident every 159 years to one accident every 76 years, respectively. SEA found these predicted rates to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Fall River County of 0.224. This represents a predicted increase of one accident every 4 years. No accidents occurred at the crossings in the County between 1993-1997.

50 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.011 to 0.018. This translates into a range of increase from one accident every 90 years to one accident every 55 years, respectively. SEA found these predicted rates to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case resulting in a system-wide change in accident frequency in Fall River County of 0.324. This represents a predicted increase of one accident every 3 years.

100 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.017 to 0.024. This translates into a range of increase

from one accident every 60 years to one accident every 42 years, respectively. SEA found these predicted rates to be below the criteria for significance

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Fall River County of 0.437. This represents a predicted increase of one accident every two years.

Weston County

20 MNT

SEA's safety analysis showed that for the 17 public highway/railroad grade crossings studied in Weston County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.002 to 0.022. This translates into a range of increase from one accident every 411 years to one accident every 45 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at Walker Ave. and Grove Ave. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Weston County of 0.110. This represents a predicted increase of one accident every nine years. No accidents occurred at the at-grade crossings in the County between 1993-1997.

50 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.004 to 0.024. This translates into a range of increase from one accident every 227 years to one accident every 41 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at West Main Street, Walker Ave., Grove Ave., E. Rail Road Street, and Highway 116. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case resulting in a system-wide change in accident frequency in Weston County of 0.157. This represents a predicted increase of one accident every 6 years.

100 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.006 to 0.027. This translates into a range of increase from one accident every 156 years to one accident every 37 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at Whoopup Canyon Road, Old Highway 85, US Highway 85, West Main Street, Walker Ave., Grove Ave., E. Rail Road Street, Skull Creek Road, Baroid Road, Highway 16, Highway 116, and Thorn Road. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Weston County of 0.216. This represents a predicted increase of one accident every five years.

Crook County

20 MNT

SEA's safety analysis showed that for the 5 public highway/railroad grade crossings studied in Crook County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.002 to 0.005. This translates into a range of increase from one accident every 424 years to one accident every 221 years, respectively. SEA found the predicted rates to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Crook County of 0.015. This represents a predicted increase of one accident every 67 years. One accident occurred in the County between 1993-1997.

50 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.004 to 0.006. This translates into a range of increase from one accident every 228 years to one accident every 166 years, respectively. SEA found the predicted rates to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case resulting in a system-wide change in accident frequency in Crook County of 0.025. This represents a predicted increase of one accident every 40 years.

100 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.007 to 0.010. This translates into a range of increase from one accident every 138 years to one accident every 99 years, respectively. SEA determined that the proposed operation significantly impacts the potential for accidents at South Big Horn Ave. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Crook County of 0.040. This represents a predicted increase of one accident every 25 years.

Campbell County

20 MNT

SEA's safety analysis showed that for the 19 public highway/railroad grade crossings studied in Campbell County, the predicted increases in accident frequency at the 20 MNT level of operation would range from 0.003 to 0.007. This translates into a range of increase from one accident every 298 years to one accident every 152 years, respectively. SEA found the predicted rates to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Campbell County of 0.119. This represents a predicted increase of one accident every eight years. No accidents occurred at the crossings in the County between 1993-1997.

50 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 50 MNT level of operation would range from 0.005 to 0.011. This translates into a range of increase from one accident every 200 years to one accident every 94 years, respectively. SEA found the predicted rates at the other locations to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case resulting in a system-wide change in accident frequency in Campbell County of 0.191. This represents a predicted increase of one accident every 5 years.

100 MNT

SEA's safety analysis showed that the predicted increases in accident frequency at the 100 MNT level of operation would range from 0.007 to 0.015. This translates into a range of increase from one accident every 143 years to one accident every 65 years, respectively. SEA found the predicted rates to be below the criteria for significance.

An increase in the accident frequency is observed for several crossings for the Post-Construction case, resulting in a system-wide change in accident frequency in Campbell County of 0.278. This represents a predicted increase of one accident every four years.

Converse County

20 MNT

SEA's safety analysis showed that for the single public highway/railroad grade crossing studied in Converse County, the predicted increase in accident frequency at the 20 MNT level of operation is 0.007. This translates into an increase of one accident every 152 years. SEA found the predicted rate to be below the criteria for significance. No accidents occurred at the crossings in the County between 1993-1997.

50 MNT

SEA's safety analysis showed that the predicted increase in accident frequency at the 50 MNT level of operation is 0.011. This translates into an increase from one accident every 94 years. SEA found the predicted rate to be below the criteria for significance.

100 MNT

SEA's safety analysis showed that the predicted increase in accident frequency at the 100 MNT level of operation is 0.015. This translates into an increase from one accident every 65 years. SEA found the predicted rate to be below the criteria for significance.

4.4.13 HAZARDOUS MATERIALS

Transportation of Hazardous Materials

The new rail line extension would be for the transport of coal from the PRB to coal users. Under Alternatives B or C, no hazardous materials are anticipated to be transported over the new

rail line. Alternatives B and C would connect PRB coal mines to the existing DM&E rail line. No users, shippers, or generators of hazardous material would be located or served by either of these alternatives. Alternative D involves reconstruction of sections of DM&E's existing rail line. This rail line is currently available to transport hazardous materials as noted in Section 4.1.11. Any hazardous materials currently transported over this rail line would continue to be transported. No increase in types or amounts of hazardous materials transported on Alternative D are anticipated as a result of this project. However, the transportation of hazardous material along the existing portions of DM&E's rail line would be expected to be safer, with less likelihood of a derailment, due to the improved condition of the rail line.

Hazardous Materials Sites

SEA identified potential impacts on hazardous waste sites in the areas of new construction. Hazardous waste sites are places where releases of hazardous materials have been reported to local, state, or Federal authorities. Related environmental concerns include facilities licensed to treat, store, or dispose of hazardous materials, leaking underground storage tanks (LUSTs), solid waste facilities and landfills (SWFs/LFs). During construction, earthmoving activities could expose contaminants to construction workers, nearby residents, and railway workers. Contaminants may also be exposed to wildlife, vegetation, surface water, and groundwater. If moving away from the initial site, disturbance to soils or local geology can either reduce or accelerate contaminant migration. Because specific site information for each identified site is not available, it is not possible to determine the potential impacts of construction on these sites. DM&E should coordinate with the EPA and South Dakota and Wyoming state agencies to obtain information on the extent of contamination to determine if it occurs within the existing right-of-way, whether construction activities have the potential to impact the site, and any protective actions necessary to avoid disturbance to these sites during construction.

During project operation, no impacts should occur to existing hazardous materials sites. There is the potential for railroad operations such as spills during derailments or improper handling of hazardous materials necessary for normal operations to result in new sites of contamination. However, this is very unlikely due to the expected reduction in derailments and regulations regarding handling, storage, and disposal of hazardous materials.

4.4.14 ENERGY RESOURCES

Transportation of Energy Resources

The proposed project has the potential to significantly impact the transportation of energy resources. Upgrading of the existing DM&E rail line would result from DM&E successfully

constructing a rail line extension into the PRB and obtaining contracts to transport coal from the basin to utilities throughout the upper Midwest. As discussed in Chapter 1, this would provide a more cost-effective transportation route for PRB coal. It would help alleviate service and congestion problems at the mines and within the PRB, making transportation of PRB coal for each of the rail carriers serving the basin more efficient and reliable. Energy resources provided by PRB coal would be available to the user at a more economical rate, higher reliability, and greater efficiency.

Utilization of Energy Resources

For many of the same reasons as discussed under Transportation of Energy Resources, the proposed project has the potential to significantly impact the utilization of energy resources, particularly relating to PRB coal and diesel fuel. The shorter route provided by the project would reduce transportation costs for PRB coal, increasing the attractiveness for utilities to switch to PRB coal or increase their use of it. Use of PRB coal is projected to increase and the proposed project would provide additional rail capacity to help the mines meet production projections and reliably deliver the coal to the user, enabling the resource to be utilized.

The shorter route would result in significant fuel saving. Based on mileages to specific power plants discussed in Chapter 2, the DM&E route could provide mileage savings of several hundred miles over the routes of other rail carriers. This would result in a potential savings of hundreds of thousands of gallons of diesel fuel annually, providing a much wiser use of this resource.

Improved utilization of energy resources could also occur at the mines. Mines are not able to expand their present operations beyond the current permitted level. However as discussed in Chapter 1, many of these mines do not currently meet these production levels, in part due to inadequate rail service. Operation of the proposed project may enable these mines to meet permitted production level and thus supply increase amounts of coal to utilities. PRB coal is more economical to mine than many eastern coals due to the relatively shallow overlying layers of soil and the thickness of the coal seams. Much of this economic advantage is due to the lower quantities of energy, such as diesel fuel and electricity, required to operate mining equipment necessary to extract, store, and load the coal. Increased utilization of PRB coal over expanded use of eastern coals would also make more efficient use of the energy necessary to mine coal to provide to the users.

Recyclable Commodities

DM&E currently transported only limited amounts of recyclable commodities. This includes less than 100 carloads annually of scrap steel. However, no shippers of recyclable materials currently have been identified along Alternatives B and C. Rebuilding of existing DM&E rail line as part of Alternative D would likely provide better, more efficient rail service to any shippers of recyclable along the existing rail line portions of Alternative D.

Additionally, the reconstruction of DM&E's existing rail line necessary for Alternative D would require removal of hundreds of miles of rail, thousands of railroad ties, bridge materials, and tons of ballast and other rail bed material. Due to its age, most of the rail would likely be unsuitable for reuse and would be sold for scrap to be recycled. Ties and wooden bridge materials could be sold for landscaping or other uses but most are expected to be in such poor shape that they would be unmarketable. DM&E could potentially sell or give them to electrical utilities currently using ties as a fuel source for electric generation. However, large quantities may require disposal in appropriate landfills. Steel bridge materials which could not be incorporated into upgraded bridges would be sold for scrap. Stone materials in some bridges and culverts may be used in railroad landscaping or sold for that purpose. Unmarketable materials could be used for fill, other aggregate uses, or landfilled. Ballast and other rail bed material no longer suitable for rail operations could be used as fill material or aggregate for other projects such as roadways.

Reconstruction of the existing rail line would not only generate large volumes of potentially recyclable materials, but would also generate a potential market for them, as would Alternatives B and C. Rail and ties generated by other rail carriers construction and abandonment activities could generate materials suitable for use by DM&E. Although these materials would likely be unsuitable for the rail line, they may be usable as part of yard and industrial sidings, spur rail lines to serve existing shippers, or temporarily to complete initial construction should sufficient new materials be unavailable. During operation, these materials would be replaced as new materials became available. However, it is anticipated that new materials would be used for most if not all new rail line construction.

4.4.15 CULTURAL RESOURCES

Impacts to cultural resources would occur if important archaeological or historic sites or structures which could substantially add to scientific understanding of human occupation of the project areas are damaged or destroyed during project construction. The project area has a rich and long history of human occupation and known sites of archaeological significance occur throughout the area. It is highly likely large numbers of yet unknown archaeological sites, many of significant importance to Tribes and the history of the area, exist through out the area and

within the rights-of-way of the Extension Alternatives. Damage or destruction of significant archaeological sites would be considered by SEA to be a significant impact.

Archaeological sites could be revealed during construction and excavation for any of the alternatives and would offer the opportunity to recover the artifacts they contain. Given the USFS and BLM standards and guidelines for protection of archaeological resources and the protection afforded them under the National Historic Preservation Act (NHPA), the possibility of irretrievably damaging a resource of scientific significance would be low. Because archaeological resources recovered on private lands remain the property of the landowner, they may be lost to scientific study following their recovery and could be damaged, destroyed, or sold. Cultural resources recovered from Federal lands would be appropriately archived and available for future study.

SEA conducted a literature review to determine the number of archaeological and historic sites within one mile of the Extension Alternatives as discussed in Sections 4.1 and 4.2. This evaluation was conducted to provide an idea of the density of known cultural resources along the alternatives, and thus the likelihood such resources would occur within the right-of-way. Based on this review, SEA determined it is very likely significant archaeological resources would occur with the right-of-way of all the Extension Alternatives. The results of SEA evaluation are provided below for each alternative.

Any impacts to known or discovered cultural resource sites associated with new construction would require mitigation in accordance with the Programatic Agreement (PA) developed for this project. Further evalutation and coordination with the South Dakota and Wyoming State Historic Preservation Officers (SHPO) would be necessary to determine the exact impact and significance of any impacts due to project construction. It is also expected that some of the cultural resources shall be eligible for the National Register as TCP's. No impacts to cultural resources are anticipated from operation of the project alternatives.

Any National Register of Historic Places (NRHP) sites within the construction right-of-way would be adversely affected by construction.

Alternative B (Proposed Action)

South Dakota

Seventy known archaeological sites are within one mile of the proposed right-of-way/construction zone for Alternative B. Fifty-nine of the sites are prehistoric, 9 of the sites are historic, and 2 of the sites have both prehistoric and historic components. None of the sites are

listed on the NRHP. However, 6 of the sites are potentially eligible for listing in the NRHP. The information available on the remaining sites indicated that NRHP eligibility is undetermined. Known sites within one mile of the proposed right-of-way/construction zone that are potentially eligible for listing on the NRHP may be adversely affected.

Wyoming

There are 228 known cultural resource sites within 1.0 mile of Alternative B in Wyoming. Of the known sites, 169 are prehistoric, 49 are historic, 3 have both prehistoric and historic components, and 9 are of unknown cultural affiliation. Fifty one of these sites are eligible for or listed on the NRHP. There are 32 sites within the right-of-way for Alternative B. Twenty-three of the sites are prehistoric, 8 are historic and 1 is unkown cultural affiliation. Six of the sites, 2 historic, and 4 prehistoric are eligible for the NRHP.

Alternative C (Modified Proposed Action)

South Dakota

There are 96 known sites within 1 mile of Alternative C. Eighty-three are prehistoric, 9 are historic, and 4 have both prehistoric and historic components. Fifty-two sites are located within the proposed right-of-way/construction zone. Thirty-nine of the sites within the right-of-way/construction zone are prehistoric, 7 are historic, 1 contains both prehistoric and historic components, and 6 contain unknown cultural components. Ten of the sites, including 8 prehistoric, 1 historic, and 1 prehistoric/historic, have been determined not eligible for the NRHP. One historic site is listed as potentially eligible for the NRHP. The remaining sites are listed as unevaluated.

Wyoming

There are 312 known sites within 1.0 mile of Alternative C. These include 217 prehistoric, 48 historic, 4 with both prehistoric and historic components and 43 with unknown cultural affiliation. Of these 49 are eligible for or potentially eligible for the NRHP, 134 have been determined ineligible or destroyed, and 129 have not been evaluated. A total of 34 known sites would be located within the right-of-way for Alternative C. Of these 4 are eligible for the NRHP, 10 are not eligible and 20 have not been evaluated.

Alternative D (Existing Transportation Corridors)

South Dakota

Alternative D has elements of both reconstruction and new construction. Alternative D involves reconstruction of existing DM&E rail line from Wall South, Dakota to Rapid City, South Dakota then to a point approximately 5 miles south of Smithwick, South Dakota. Alternative D then becomes new construction to the South Dakota-Wyoming State line. There are 71 known sites along this portion of the project area in South Dakota. Of the known sites, 56 are prehistoric, 10 are historic, 2 have both prehistoric and historic, and 3 are of an unknown cultural affiliation. Four of the 71 sites are NRHP eligible. Only 9 of the known sites are within the existing right-of-way. All but one of the these sites are prehistoric and the other is historic, all are unevaluated for the NRHP. There are 130 bridges and culverts along the reconstruction portion of Alternative D, 110 are eligible for the NRHP. The bridges are open deck pile timber (83 total with 69 NRHP eligible), deck plate girder (19 total with 15 NRHP eligible), through plate girder (6 total with 5 NRHP eligible), through truss (2 total with both NRHP eligible), I-beam (4 total with 3 eligible), stone box culverts (all 11 NRHP eligible), stone arch culverts (all 3 are NRHP eligible), concrete arch culvert (1 total, NRHP eligible), and wooden box culvert (1 total, NRHP eligible). It is likely that other railroad related facilities (water stops, depots, freight houses, maintenance yards etc.,) would be considered eligible for the NRHP if they are formally evaluated. None of the known archaeological sites are considered eligible for listing on the NRHP.

Wyoming

There are 229 known sites and 59 known isolated finds within one mile of the proposed alignment. Of the known sites, 88 are prehistoric and 42 are historic, the cultural affiliation of 91 of the sites are unknown, and 8 have both historic and prehistoric components. Of the known sites, 2 are listed on the NRHP, 34 are eligible for the NRHP and 117 are not eligible. The remaining 76 sites have not been evaluated. Of the known sites, 36 would be within the proposed right-of-way. Five of the 36 sites within the proposed right-of-way are eligible for the NRHP and 1 is on the NRHP. Of the remaining 31 sites, 15 are not eligible for the NRHP and 16 have not been evalutated.

4.4.16 SOCIOECONOMIC

Socioeconomic impacts resulting from the new build alternatives in South Dakota and Wyoming are anticipated to occur both short term and long term. Short term impacts would be related to construction activities associated with increased construction employment and are

anticipated to last approximately two to three years. Long term operational impacts such as railroad-assessed taxes and permanent jobs, could be anticipated for the next several decades. The following discusses those impacts related to the construction of the various Extension Alternatives in South Dakota and Wyoming. Socioeconomic impacts related to rail yards along the Extension Alternatives are discussed in Section 4.9.

4.4.16.1 Population and Demographics

All of the Extension Alternatives would pass through generally the same geographic area of South Dakota and Wyoming. The limited and scattered communities throughout the area are the only sources of goods, services, and facilities required for construction workers. Therefore, all of these communities would likely be affected by any of the Extension Alternatives and each of the Extension Alternatives would have similar impacts on the population of the project area. It is likely that the counties in South Dakota and Wyoming through which the alternatives would be constructed would experience short-term increases in population during construction. Over 900 two to three year jobs are expected that would be directly related to the construction of the Extension Alternatives. While it is likely that many of these would be filled by local workers, other workers specialized in rail construction would likely relocate to the area. Bridge and culvert crews would relocate for the entire period of construction, while rail line workers would only be present during the months of construction (April to November). Construction workers would not likely locate permanently in the area, rather they would move to the area of the next project following completion of their work on this project. They could utilize temporary lodging, such as motels, hotels, rental property, recreational vehicle (RV) parks, and campgrounds where available. If local lodging is utilized, workers would likely relocate throughout construction, moving to be closer to the actual job site. Communities such as Hot Springs, and Edgemont in South Dakota, Newcastle, Douglas, Wright, and Gillette in Wyoming, would be possible locations for workers to find temporary residency. However, DM&E has determined that it would likely be necessary to establish mancamps to accommodate work crews in areas that would be without the necessary services of a nearby town or because adequate facilities for the number of construction workers are not available in nearby communities. DM&E has not indicated the locations, sizes, and facilities for these mancamps. However, they have indicated they would be located so as to avoid environmentally sensitive areas.

During operation of the project, permanent employment would be added to the area along the rail line. The increased traffic on the DM&E rail line would require hiring additional train crews, maintenance personnel, and office staff. Most of these additional, permanent jobs would be associated with rail yards and are discussed in Section 4.9.1.1.9. Additional permanent employees would likely settle in communities, such as Hot Springs, Rapid City, Edgemont, Newcastle, and Gillette, due to their proximity to the rail line.

Table 4.4-40 provides a summary, by county, of the potential direct and indirect construction jobs associated with these alternatives in South Dakota and Wyoming. Because Alternative D would only travel through approximately 15 miles of Crook County, Wyoming, socioeconomic data were considered to be minimal and were therefore not calculated for this county. However, residents of this county would likely take advantage of employment opportunities created by the project, and businesses in Moorcroft could expect increased patronage from construction workers and railroad crews.

Table 4.4-41
Employment Compared to Population Statistics for Potentially Affected Counties

County	Construction Employment		Percent of County Population/County unemployed (1994)	Change in County Population (1986-1994)
	Direct	Indirect		
Pennington	158	107	<1/3.3	11.2
Custer	149	66	3/4.3	4.3-
Fall River	189	84	4/3.8	9.7-
Niobrara	44	13	2/3.6	21.3
Weston	168	50	3/5.9	20.4-
Converse	39	12	<1/5.4	18.7-
Campbell	175	52	<1/5.4	18.8-
Total	922	384		

4.4.16.2 Employment and Income

Construction is anticipated to take two to three years and would occur simultaneously at several locations along the approved rail line alignment. Approximately 498 direct construction related jobs are anticipated for new rail line construction in South Dakota and approximately 427 in Wyoming. These jobs would be spread throughout the project area in each State, with the total number of workers divided into numerous smaller crews responsible for a particular aspect of

construction, such as rail bed preparation or rail placement, or completion of a particular geographic area of the project.

Construction jobs would require a wide range of workers and activities. More generalized jobs such as heavy equipment operators, carpenters, electricians, landscapers, truck drivers, and mechanics would likely be filled by local workers, contractors, and farmers and ranchers during slow periods for those activities. However, because of the number of workers required, non-local workers may also be required to fill these positions. Additionally, many unskilled laborer or apprentice positions would also be available. More specialized workers, such as rail construction contractors, would likely be non-local. Such contractors in-state could be utilized. However, as these workers tend to be specialized in what they do and relocate from job to job, they would likely be filled by non-local and out-of-state workers.

In addition to direct construction jobs, approximately 384 indirect jobs are anticipated to be generated by the proposed project. These jobs would occur over the construction period and would likely continue for two to three years after construction completion. These jobs would result from construction workers, both local and non-local, that would be present during construction. Local workers would have consistent income resulting in them having more money to spend locally on goods and services. They would continue to spend following construction completion, thus resulting in the two to three year post-construction requirement for jobs. Non-local workers would spend portions of their income locally, increasing the demand for goods and services. Additionally, non-local workers would require lodging, using local hotels, motels, rental properties, and trailer and RV parks where available. In such cases where lodging and food services would not be available, mancamps would be required. These camps would likely obtain provisions such as food, fuel, and miscellaneous supplies from the nearest town. All these economic sectors would be expected to increase in demand and value due to increased business. New businesses such as grocery stores, convenience stores, gas stations, and bars could be expected, resulting in additional construction activity, providing jobs for construction workers as well as to staff the new business. Table 4.4-42 provides estimates of construction related earning in the project counties. A portion of these earnings would be available to purchase goods and services from local business and provide tax revenues for the State and county.

Table 4.4-42
Construction Earnings by County

County	Estimated Earnings ($)
Pennington	30,844,800
Custer	20,585,500
Fall River	26,179,200
Niobrara	4,959,000
Weston	18,867,000
Converse	4,351,000
Campbell	19,604,000
Total	**125,390,500**

The population in the South Dakota project area counties is over 93,000 with an average unemployment of 3.9 percent. The population on the Wyoming project area counties is over 57,000 with an average unemployment rate of 4.9 percent. At this rate, approximately 3,627 persons are unemployed in the South Dakota project area, and approximately 2,793 persons are umemployed in the Wyoming project area. Although these persons may not have the specific skills for rail line construction, they would likely have job skills that could provide for employment in one or more of the many job areas created during construction, including non-skilled laborer and apprentice positions, and service industries. Workers in laborer and apprentice positions would have the opportunity to learn a skill or trade and obtain permanent employment in that field following completion of rail construction. More skilled workers in many areas could be expected to seek employment at positions created by rail line construction as higher wages would likely be paid for these jobs. This would create positions for less skilled employees as well as opportunities for persons seeking to learn new jobs. Unemployment throughout the project area could be expected to decline. However, the demand for labor could result in competition for workers and thus higher wages and better benefits to attract qualified employees. This seems likely due to the low unemployment within the region.

Access throughout the project area would be provided by state and local roadways. Persons throughout the area would be expected to travel some distance for opportunities at higher wages at jobs related to project construction. Additionally, the attractiveness of many good paying jobs in the area may result in non-local workers or those unemployed relocating in the area

in order to seek employment. Such relocations would be minimal and not exected to mpact county-level employment.

DM&E would likely acquire a variety of construction materials and supplies within the immediate and adjacent project area. These could include concrete, steel, ties, rail, ballast rock, fill, subgrade and subballast material, fencing, lumber, and a variety of other materials. It would be preferable to acquire these locally due to increased costs associated with importing materials. While it is likely many materials would not be available locally, many local businesses would be able to provide what materials they could. These businesses would include commercial gravel, rock, and sand quarry operations, hardware stores, lumber yards, ready mix plants, and other construction related material dealers. Providers of these materials could expect increase in sales during the construction period.

During project operation, new permanent jobs related to continuing rail operations would be created. Additional jobs for train crews, maintenance personnel, and office workers would be available. New jobs comparable in salary and benefits to those of other Class I railroads would be expected. These jobs would primarily be associated with rail yards and are discussed in Section 4.9.

Potential project impacts to employment and income are expected to be beneficial and potentially significant, particularly during construction. Employment opportunities are expected to increase and unemployment decrease throughout the area. Lower unemployment would increase the demand for workers, resulting in higher wages and better benefits potentially being offered to attract qualified persons. Following construction, high-paying railroad jobs would continue to benefit the labor market by providing high-paying jobs within the area.

4.4.16.3 Public Services and Fiscal Condition

Impacts to public services and fiscal condition would be similar for each of the new build alternatives. Numerous services are provided by the various counties in the project area as discussed in Section 4.1.14.3 for South Dakota Counties, and Section 4.2.14.3 for Wyoming Counties. The anticipated increase in employment for the project counties would not likely place undue strain on the public services. For Pennington County in South Dakota, and Converse and Campbell counties in Wyoming, the increase in employment represents less than one percent of the total population of the county. Custer and Fall River Counties in South Dakota would experience an increase in employment greater than one percent of the county population. Niobrara and Weston Counties in Wyoming would also experience an increase in employment greater than one percent of the total county population. Each of these counties have experienced decreases in population over the last ten years that would compensate for the employment

increase. The employment increase in each project county would be less than the unemployment rate for each county. All the counties should be able to absorb the increases in population, both temporary and permanent, without experiencing any problems in continuing to provide adequate services. In those counties experiencing population declines, increase due to this project may help offset some of the population decline, increasing the county tax base and providing increase revenue for county services.

Counties are able to fund a variety of services by collecting property and other taxes. As part of the proposed project, all the area counties should receive additional tax revenues. These revenues would result from new railroad facilities being constructed, existing facilities upgraded, and increased spending by construction workers and additional permanently employed individuals within the county. Table 4.4-43 provides an estimate of the sales and use taxes generated in each county during project construction due to purchases of materials for construction and spending by construction workers for goods and services. A portion of these taxes would be available to the county.

Table 4.4-43
Sales and Use Taxes Generated by County

County	Taxes ($)
Pennington	3,037,800
Custer	2,238,100
Fall River	3,011,900
Niobrara	942,000
Weston	2,443,000
Converse	525,000
Campbell	2,687,000
Total	**14,884,800**

Additionally, DM&E would pay property taxes on its facilities. These taxes would vary between counties, depending on the actual facilities located in the county and the county's tax assessment rates. Table 4.4-44 provides an estimate of the property taxes DM&E would pay each

year under the 40 MNT and 100 MNT operating scenarios.[16] These amounts are compared to the taxes DM&E paid in 1997 and the total taxes collected by the counties in 1997.

Table 4.4-44
Comparison or Property Taxes Paid and Anticipated for the Proposed Project

County	DM&E 1997 Taxes Paid ($)	Taxes Assessed at 40 MNT ($)	Taxes Assessed at 100 MNT ($)	Total Taxes Collected 1997 ($)
Pennington	4,564	1,474,300	1,793,900	3,272,764
Custer	555	1,235,300	1,503,100	2,738,955
Fall River	784	2,496,100	3,037,100	5,533,984
Niobrara	0	268,000	323,000	591,000
Weston	0	1,129,000	1,365,000	2,494,000
Converse	0	221,000	267,000	488,000
Campbell	0	979,000	1,183,000	2,162,000
Total	**5,903**	**7,802,700**	**9,472,100**	**17,280,703**

As can be seen, property taxes under the proposed project would increase substantially over those currently assessed for DM&E. This additional revenue would contribute significant additional funds to each of the counties. These funds would enable the counties to continue to provide their current services, possibly enabling them to upgrade or increase services. Any increase in county population due to the project should easily be accommodated by the increased revenues generated by the project.

Overall, the project should have a beneficial impact on the services offered by the counties and the counties fiscal conditions. Increased tax revenues should easily offset any additional financial burden the project may cause the counties while still providing additional revenues for county services.

[16] The 40 MNT and 100 MNT levels are both included as the increase in operations would require construction of additional facilities that would increase the value of DM&E property within each county. Because the level of operation would be subject to the market, both of these levels are presented for comparison. The 20 MNT level of operation was not evaluated in the economic report prepared for the project. This level of traffic would occur at project startup and is anticipated to only occur for a short time before operating levels increase. Therefore, 40 MNT and 100 MNT likely are a more accurate reflection of the potential long term tax impacts.

4.4.17 ENVIRONMENTAL JUSTICE

SEA conducted an analysis at the census block group level along each of the Extension Alternatives to determine if any of the communities along the alternatives met criteria established for them to be considered potential environmental justice communities, as discussed in Sections 4.1.15 and 4.2.15. SEA identified these communities in order to determine if the different Extension Alternatives would potentially have a disproportionately high and adverse impact on any of these communities. Following completion of its impact analysis, SEA reviewed the potential impacts to the identified minority and low-income communities to identify if significant impacts could occur to these communities. SEA notes that the type and nature of impacts to these communities would be the same as to non-minority and non-low-income communities. However, in consideration of Executive Order No. 12898, SEA considered it appropriate to determine if any of the significant impacts resulting from the Extension Alternatives would be borne disproportionately by environmental justice communities.

SEA found the impact of increased noise due to operation of locomotives to be the only significant impact that would potentially occur to enviromental justice communities. SEA considered noise levels of greater than 65 dBA L_{dn} due to both wayside and horn noise to be high and adverse. As part of its analysis, SEA determined that environmental justice communities would disproportionately bear the impacts of increased noise levels along Alternative D. SEA's analysis found that disproportionate noise impacts would occur to one low-income community in Wall and four minority communities in Rapid City (Appendix D). All of these communities occur along the existing DM&E rail line portion of Alternative D.

4.4.18 RECREATION

Potential impacts to recreation would occur if construction or operation of the alternatives resulted in:

- Introduction of noise or light pollution into national or state parks or monuments.
- Loss of recreational lands or suitability of lands for recreational activities.
- The elimination of an area or portion of an area from eligibility for designation as wilderness.
- The elimination of the wild and scenic river status or eligibility of all or a portion of any stream or river.
- Disturbance or elimination of recreational opportunities.

One of the important characteristics of the project area is the feeling of remoteness it provides to individuals. The absence of unnatural sights and sounds combined with the wide viewshed provide a feeling of remoteness, vastness, and wilderness. During nighttime hours, areas along the rail line where no unnatural lights are visible, providing opportunities for star gazing. The lack of noticable light also contributes to the sense of wilderness and remoteness the person may experience. Quiet contemplation is considered an important component of recreation throughout the project area. These qualities, combined with the abundant recreational opportunities of the area (hunting, fishing, bird watching, camping, hiking, touring) on both private and abundant public lands, help to provide a quality recreational experience for local residents and visitors.

Construction activities would create noise and light that would be unnatural to the area. Construction noise has the potential to disturb a wide variety of recreational activities on those lands adjacent to the rail line. Construction lighting would be visible for significant distances, adding to the unnatural character of the area and contributing light pollution that may reduce the visibility of the night sky. Additionally, thousands of acres of public and private land, much of which has recreational value, would be converted to rail line right-of-way and no longer available for recreational use. Adjacent areas also may also be undesirable for recreation due to the noise and human activity associated with construction and noise and disturbance from passing trains during rail line operation.

Because of the undeveloped and remote character of the project area, several areas have been considered for classification as wilderness. These include the Red Shirt and Cheyenne River RARE II areas. Additionally, the HA Divide and Red Hills Inventoried Roadless Areas (considered to potentially meet the criteria for wilderness designation) and the Sage Creek Wilderness Area occur within the project area. Construction of a rail line across these lands would likely introduce a type of development that would make these areas no longer eligible for wilderness designation. Such areas are becoming increasingly uncommon due to encroachment of development. Additionally, operation of a rail line in close proximity would introduce unnatural sights and sounds that could make these areas or portions of these areas ineligible for wilderness designation.

Streams and rivers with scenic or wilderness characteristics still in their free-flowing condition may be designated as Wild and Scenic under the National Wild and Scenic Rivers Act of 1968 (P.L. 90-542; 16 U.S.C. 1271-1287) to protect the natural qualities they provide. Entire streams and rivers or identified stretches of streams and rivers may be so designated. As with wilderness areas, construction and operation of a rail line in proximity to such waterways could introduce unnatural sights and sounds that would result in the stream no longer being eligible for such a designation.

Alternative B (Proposed Action)

Alternative B would cross 67.7 miles of public land, including 51.9 miles (2,516.4 acres) managed by the USFS, 5.7 miles (276.4 acres) managed by the BLM, and 10.1 miles (489.7 acres) owned by South Dakota or Wyoming. Alternative B would cross both the Red Shirt and Cheyenne River RARE II areas, and the Red Shirt Inventoried Roadless area. It would also pass within 200 feet of the HA Divide Inventoried Roadless area and be located across the Cheyenne River from the Indian Creek RARE II area.

Alternative B would be within 3,700 feet of Badlands National Park. Some of the most striking qualities of Badlands are its wilderness character, quiet and solitude. Quiet contemplation is an important park experience. Operating a railroad in close proximity to the park would have an adverse impact on these qualities in those portions of the park where they would be noticable. Alternative B would parallel the approximately 8.0-mile stretch of the Cheyenne River between the community of Red Shirt and its confluence with Battle Creek, considered by the USFS to be eligible for designation as Wild and Scenic. Construction and operation of Alternative B would make this stretch of the river ineligible due to the proximity of the rail line to the river and the visual intrusion it would create.

Alternative C (Modified Proposed Action)

Alternative C would cross 55.5 miles of public land, including 38.9 miles (1,886.1 acres) managed by the USFS, 4.9 miles (237.6 acres) managed by the BLM, and 11.7 miles (567.3 acres) owned by South Dakota or Wyoming. Although Alternative C does not cross any RARE II areas, it would be within 500 feet of the Red Shirt and Cheyenne River RARE II areas and the Red Shirt Roadless Area. No parks, wild and scenic rivers, or natural landmarks would be affected by this alternative.

Alternative D (Existing Corridors Alternative)

Alternative D would cross 40.5 miles of public land, including 26.7 miles (647.3 acres) managed by the USFS, 3.0 miles (72.7 acres) managed by the BLM, and 10.8 miles (261.8 acres) owned by South Dakota or Wyoming. No parks, wild and scenic rivers, or natural landmarks would be affected by this alternative.

4.4.19 AESTHETICS

4.4.19.1 Visual Resources

Impacts to visual resources are difficult to determine due to the differences in what individuals perceive as scenic and of scenic value. No designated scenic areas or overlooks occur along the project alternatives. However, numerous areas that could be considered scenic would be affected by construction and operation of a rail line introducing an unnatural component to the landscape. The USFS has attempted to quantify the scenic value of its lands based on the visual quality objective (VQO) established by the USFS for an area.

The USFS uses VQOs to define the acceptable degrees of natural landscape alteration. All of the alternatives cross USFS lands which have an existing VQO of modification and partial retention. A designation of modification allows development to occur, even development considered to have significant contrast to the existing landscape. However, facilities, buildings, roads, and signs must conform to the existing environment in terms of color, textures, and materials. The partial retential VQO designation is typically restricted to riparian corridors and waterbodies, and activities must be subordinate to the surrounding environment. In these areas the construction of the railroad is expected to cause significant impacts to visual resources.

As discussed in Section 4.4.8, concerns were expressed by several Federal agencies for the potential impacts of the project to the visibility at Class I areas. SEA conducted CALPUFF modeling to determine the potential visibility impairment at these areas due to the Extension Alternatives. The results of this analysis are discussed in detail in Section 4.4.8.

Alternative B (Proposed Action)

Alternative B would cross 11.6 miles of BGNG that have VQO of modification. In Wyoming, this alternative would cross 30.7 miles of TBNG with a VQO of modification. The alternative would cross 2.6 miles of BGNG with a VQO of partial retention. In Wyoming, this alternative would affect 4.9 miles of TBNG with a VQO of partial retention.

Alternative C (Modified Proposed Action)

Alternative C would cross 5.2 miles of BGNG with a VQO of modification. In Wyoming, this alternative would cross 28.4 miles of TBNG with a VQO of modification. In South Dakota, this alternative would cross 0.7 miles of BGNG with a VQO of partial retention. In Wyoming, this alternative would affect 4.4 miles of TBNG with a VQO of partial retention.

Alternative D (Existing Corridors Alternative)

Alternative D would not cross any USFS lands in South Dakota. Therefore, no impacts to visual resources would occur. This alternative would cross 22.7 miles of TBNG with a VQO of modification and 4.0 miles with a VQO of partial retention. Because this alternative would be constructed adjacent or close to an existing rail road, visual impacts would be reduced compared to Alternatives B and C.

4.4.19.2 Nightlights

In the event that it would become necessary for construction crews to work during the dark hours, the use of artificial lighting during the construction phase of the project would result in light pollution impacts in the area. If near the proposed rail line, construction, security, or other associated lighting could disturb residents trying to sleep. Such lighting may be recognized by local residents as unusual, but it is not anticipated to detract from the nature of the night environment as discussed in Section 4.4.19.1. Minimal impacts from lighting along the rail line would be expected due to the sparse population in the proposed construction area and the movement along the rail line as construction proceeds. Nightlights would only occur at scattered locations over the two to three year construction period.

During rail line operation, the lights from passing trains during dark hours may have minor impacts on the people living near the rail line. However, any impacts would be restricted to those residents in close proximity to the rail line. Because train headlights would be directed down the rail line, impacts would be minimal and similar to those that presently occur due to other types of traffic in the area. Any changes in nightlights resulting from construction and operation would not significantly alter the night environment of the project area.

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4.5 SPRING CREEK ALTERNATIVES

As discussed in Chapter 2, two alternative routes have been established for use with Alternatives B and C in the Spring Creek area of South Dakota. The Spring Creek Segment was the original alignment for both alternatives and it generally followed Spring Creek. Because of environmental concerns with this alignment, particularly its proximity to the Cheyenne River, wetlands along Spring Creek, and USFS RARE II areas it would cross, an alternative alignment, the Phiney Flat Alternative, was developed. Either of these alternatives could be used with either Alternative B or C. The following discussion provides a comparison of the potential impacts of these two alternatives. In general, the impacts for the Spring Creek Segment are the same for Alternatives B and C. However, the alignment established along this segment does vary slightly between Alternative B and C. When differences in potential impacts exist due to the differences in alignment, the Spring Creek Segment is discussed by Alternative B and C. Information on the existing environment along these alternative alignments is provided in Section 4.1. More detailed discussion of the types, nature, and significance of impacts to the various resources discussed is included under each resource topic in Section 4.4.

4.5.1 GEOLOGY AND SOILS

Section 4.4.5 discusses the potential impacts to geology and soils that could result from new rail line construction and operation. Impacts would generally be expected to occur during the construction of new rail line and would include creation of unstable areas leading to slope slumps or landslides, clearing and soil disturbance resulting in increased erosion, and loss or damage to paleontological resources.

4.5.1.1 Geologic Hazards

Spring Creek - Alternative B

This alternative would cross 3.1 miles (approximately 150.3 acres) of soils that have a high slump/landslide potential. The clay-mineral content of these rocks is moderate to high, so they are susceptible to slumps and earth flows. The potential for slumps or landslides would be high where this alternative would cross steep slopes, approximately 4.4 miles.

Spring Creek - Alternative C

This alternative would cross 2.6 miles (approximately 126.1 acres) of soils that have a high slump/landslide potential. As with the other alternatives, the potential for slumps or landslides would be high where this alternative would cross steep slopes (approximately 3.1 miles)

or where cutting or loading of slopes or unusually high precipitation may cause landsliding in these formations.

Phiney Flat

This alternative would cross 1.7 miles (approximately 82.4 acres) of soils that have a high slump/landslide potential. However, this alternative would cross primarily level terrain (only 1.6 miles of steep slopes) which should not be prone to slumping.

4.5.1.2 Soil Impacts

Spring Creek - Alternative B

The impacts to soil would be similar to the other portions of the Extension Alternatives, discussed in Section 4.4.5.3, which include the loss of topsoil, sedimentation, erosion and the possibility of the introduction and establishment of noxious weeds. The Spring Creek Segment of Alternative B would disturb approximately 412.1 acres of soil over its 8.5-mile length. This alternative would cross 4.2 miles (206.6 acres) of soils with an erosion hazard. No prime farmland would be impacted by this alternative.

Spring Creek - Alternative C

The Spring Creek Segment for Alternative C would disturb approximately 412.1 acres of soil over its 8.5-mile length. This alternative would cross 4.2 miles (206.6 acres) of soils with an erosion hazard. This alternative would cross 0.3 mile (approximately 14.5 acres) of prime farmland.

Phiney Flat

The 10.3-mile Phiney Flat Alternative would disturb approximately 499.4 acres of soil. This alternative would not cross any soils with an erosion hazard. This alternative would cross 3.6 miles (approximately 174.5 acres) of soils classified as prime farmland.

4.5.1.3 Paleontological Resources

Spring Creek - Alternative B

This alternative would cross a total of 1.5 miles (approximately 72.7 acres) of formations with a PFYC of 5. Impacts to these areas would be similar to those discussed for the other areas

of Alternative B (Section 4.4.4.5) and include the chance of destruction of important fossils, particularly vertebrate fossils such as dinosaurs and prehistoric mammals.

Spring Creek - Alternative C

This alternative would cross 3.3 miles (approximately 160.0 acres) of formations with a PFYC of 5. Impacts would be similar to those discussed for the other areas of Alternative C (Section 4.4.4.5).

Phiney Flat

This alternative would cross 10.2 miles (approximately 494.5 acres) of formations with a PFYC of 5. Impacts would be similar to those of the Spring Creek Segment.

4.5.2 LAND USE

Potential project impacts to land use would include conversion of current land use to rail line right-of-way, preclusion of existing land uses within the right-of-way, and incompatibility with adjacent land uses. These impacts and others are discussed in more detail in Section 4.4.6. The following provides an overview of the land use types affected by each of the Spring Creek Alternatives.

4.5.2.1 Agriculture

Spring Creek - Alternative B

This alternative would cross 8.5 miles (approximately 412.2 acres) of rangeland. Impacts to this resource would be similar to those discussed in Section 4.4.6.1, including the direct loss of forage during construction, fragmentation of allotments, isolation of water sources and disruption of operations. The Spring Creek Segment of Alternative B would cross 3 Federal grazing allotments. The total amount of allotment disturbance would be 52 acres and result in the loss of approximately 16 AUM's.

Spring Creek - Alternative C

This alternative would cross 7.9 miles (approximately 383.0 acres) of rangeland and 0.6 miles (approximately 29.1 acres) of cropland. Impacts to this resource would be similar to those mentioned above. No Federal grazing allotments would be affected by this alternative.

Phiney Flat

This alternative would cross 4.6 miles (approximately 223.0 acres) of rangeland and 5.7 miles (approximately 276.4 acres) of cropland. Impacts to this resource would be similar to those mentioned above; however, this alternative would cross fewer miles than either of the Spring Creek alignments. No Federal grazing allotments would be affected by this alterative.

4.5.2.2 Residential

No impacts to residential areas are expected for any of these alternatives.

4.5.2.3 Business and Industrial

No impacts to business and industrial areas are expected for any of these alternatives.

4.5.2.4 Mineral and Mining

No impacts to mineral resources are expected for any of these alternatives.

4.5.2.5 Federal Lands

4.5.2.5.1 Forest Service Lands

Spring Creek - Alternative B

This alternative would cross 1.4 miles (approximately 67.9 acres) of semi-primitive motorized USFS lands. Impacts to these lands would include noise from railroad construction and operation and the visual intrusion of a new rail line, rail bed, and right-of-way. Additionally, since the railroad would not be compatible with the semi-primitive motorized designation, it would be likely that these lands would be degraded to a lower Recreational Opportunity Spectrum (ROS) designation.

Spring Creek - Alternative C

This alternative would not impact any USFS lands.

Phiney Flat

These alternatives would not impact any USFS lands.

4.5.2.5.2 Bureau of Land Management Lands

No impacts to BLM lands are expected for any of the alternatives.

4.5.2.5.3 Bureau of Reclamation Lands

No impacts to Reclamation lands are expected for any of the alternatives.

4.5.2.5.4 Fish and Wildlife Service Lands

No impacts to USFWS lands are expected for any of the alternatives.

4.5.2.6 Reservation and Treaty Lands

No impacts to these lands are expected for any of the alternatives.

4.5.3 WATER RESOURCES

4.5.3.1 Surface Water Impacts

Potential types of impacts to water resources are discussed in detail in Section 4.4.7. Construction and operation of a new rail line could affect water resources by increasing erosion into the water and subsequently reducing water quality, disturbing or altering the stream causing changes in stream hydrology, contaminating water in the event of a spill, and damage to or loss of wetlands.

Spring Creek - Alternative B

This alternative would cross 16 perennial and 23 intermittent streams. Construction impacts would be limited to the period of construction and reclamation and would occur primarily at the crossing locations. Impacts could likely include increased erosion and sedimentation, increased water temperature and loss of habitat for aquatic and terrestrial species.

Spring Creek - Alternative C

This alternative would cross 26 perennial and 44 intermittent streams. Impacts would be similar to those discussed for Spring Creek Alternative for Alternative B.

Phiney Flat

This alternative would cross 1 perennial and 13 intermittent streams. This alternative would have fewer potential impacts to water resources than the Spring Creek Alternatives since it has fewer stream crossings. Impacts would be similar to those discussed above.

4.5.3.2 Wetlands

Spring Creek

This alternative would cross 0.2 mile (approximately 9.7 acres) of forested wetlands. These wetlands would be lost through conversion to rail line right-of-way.

Phiney Flat

This alternative would cross approximately 1.0 acre of emergent wetlands. These wetlands would be lost through conversion to rail line right-of-way.

4.5.4 AIR QUALITY

Construction of the Spring Creek Segment or Phiney Flat Alternative has the potential to impact local air quality, as discussed in Section 4.4.8. Impacts would generally result from fugitive dust during earthmoving activities and emissions from construction vehicles and equipment.

SEA calculated the increase in air pollutant emissions that would result from increased rail operations for these alternatives. The air pollutant emission sources from trains include emissions from the locomotives operating along the new rail line alternatives. A summary of the potential emission increases are shown in Tables 4.5-1 to 4.5-6. These emissions are in addition to those presented in Tables 4.4-2 to 4.4-10 for the other portions of the Extension Alternatives.