APPENDIX B

SUPPORTING DATA

SOILS

Soil Association Descriptions

Bankard-Haverson-Kim-Riverwash-Association (No. 1)

This unit occurs as nearly-level, well-drained, deep soils on the floodplains and alluvial fans. Soils in this association developed in alluvium along sandy, shifting bottomlands and along rivers and major streams. They may occupy undulating fans, terraces, and bottomlands.

The Bankard series is on the floodplains, fans, and level terraces; Haverson soils are situated on the bottomlands; and Kim soils are found on alluvial fans below upland areas.

The soils of this association are moderately alkaline and subject to flooding during spring and early summer. They are highly susceptible to wind erosion. The acreage of this soil association is estimated to be 184,134 acres.

Razor-Shingle Association (No. 2)

This unit includes very shallow to moderately deep, well-drained, loamy, sandy, and clayey soils from sandstone and shale on sloping to steep uplands.

This association consists primarily of shallow soils and bedrock exposures on steeply sloping badlands bordering the larger streams and in areas where the bedrock has been uplifted. Shingle soils are less than 20 inches deep to shale and sandstone bedrock. Razor soils are 20 to 40 inches deep to shale or siltstone bedrock. These soils produce very little vegetation. Revegetation opportunities are very poor, and the soils are highly erodible. The acreage of this soil association is estimated to be 351,228 acres.

Renohill-Maysdorf-Ulm Association (No. 3)

This unit represents moderately deep to deep, well-drained, loamy, sandy, and clayey soils on level to nearly level alluvial fans and sloping to steep uplands.

This association consists of moderately deep soils interspersed with deep, medium to fine-textured soils. Renohill soils occur on ridgetops and ridgecrests; Ulm soils are situated on nearly level upland fans and terraces; and Maysdorf soils are found on moderately sloping upland hills and valley sideslopes.

Soils of this association are highly erodible. Productivity potential is considered moderate. The acreage of this soil association is estimated to be 378,745 acres.

Unnamed Association (No. 4)

These soils are known to be deep to shallow, well drained, loam and clay loam on gently sloping alluvial fans and sloping to moderately steep uplands.

Soil series names have not been identified for these soils; however, the following information can be assumed from their classification. These soils are considered to be mostly medium textured, including textural families of fine loamy and fine. Depth is variable, ranging from less than 20 inches to greater than 40 inches over bedrock. The clay fraction of the fine family has montmorillonitic minerology. The representative soils of this unit range from (1) Ustollic Paleargids, fine, montmorillonitic, mesic, indicating relict soils on the oldest stable erosion surfaces with fine-textured B horizons having abrupt upper boundaries, (2) Ustollic Haplargids, fine loamy, mixed, mesic, shallow, medium-textured soils less than 20 inches to soft bedrock with normal illuvial B horizons having simple morphology, and, (3) Ustic Torriorthents, fine loamy, alluvial or eolian; they have little pedogenic development. Productivity is assumed to be low to moderate; erodibility is high. The estimated acreage of this soil association is 250,382.

Renohill-Terry-Shingle Association (No. 5)

The soils are moderately deep and shallow, well drained, fine sandy loam, loam, and clay loams on moderately steep to steep uplands, ridges, and sidehills.

Renohill soils are moderately deep, fine-textured soils on ridgetops and underlain by shale. Terry soils are moderately deep, moderately coarse-textured soils occurring on side slopes and underlain by sandstone. Shingle soils are shallow and occur on steep upland ridges, usually dissected with numerous drainages and underlain with shale.

These soils are highly erodible and have low productivity potentials. The estimated acreage of the association is 280,102 acres.

Renohill-Wyarno-Cushman Association (No. 6)

These soils are deep and moderately deep, well-drained loam and clay loams on nearly level to sloping

alluvial fans and gently sloping to moderately steep uplands. They overlie interbedded sandstones, shales, and siltstone.

Renohill soils are moderately deep, fine textured, and occur on ridgetops and ridgecrests; Wyarno soils are deep, well drained, and formed in alluvium; and Cushman soils are moderately deep and occupy moderately steep upland positions underlain by soft sandstone at depths of 30 inches. Productivity potential is considered to be moderate and erodibility is high. The estimated acreage is 259,441 for the association.

Wibaux Association (No. 7)

This unit is dominantly shallow but includes very shallow to moderately deep, well-drained sandy loam, clay loam, and channery loam soils on sloping to steep uplands and rough, broken land with shallow, sandy to medium-textured soils. This association occupies rolling to steep topography. It is characterized by numerous outcrops of scoria and scoria chips in the profile. Thirty to 60% of the surface has large scoria clinkers. These soils are highly erodible, and the productivity potential is low. The estimated acreage of this association is 220,274.

Renohill-Wibaux-Tassel-Shingle-Rockland Association (No. 8)

This unit includes shallow and moderately deep, well-drained sandy loam, clay loam, clay, and channery loam soils on sloping to steep uplands and rough, broken land with shallow, sandy to medium-textured soils.

The Renohill soils are moderately deep, fine textured, and occur on ridgetops and ridgecrests; Wibaux soils are shallow, well drained, medium textured, and gravelly, occurring on sloping to steep uplands; and Tassel and Shingle soils are shallow, sandy soils on rolling to steeply rolling slopes. Rockland within the unit consists of miscellaneous soil materials that are sandy to clayey on steep, broken slopes with exposed bedrock.

These soils are moderately to highly erodible with productivity potentials low to moderate. Acreage estimated for this association is 145,124.

Renohill-Cushman Association (No. 9)

This unit includes moderately deep, well-drained loam and clay loam soils on nearly level to moderately steep uplands. The Cushman soils are moderately deep soils on nearly level to gently sloping upland plains, while Renohill soils are situated on ridges and side slopes. Productivity potential and erodibility are considered moderate. The estimated acreage of the association is 275,548.

Renohill-Shingle-Terry Association (No. 10)

This association occupies the steep to very steep upland ridges and sidehills which are usually dissected with numerous drainages. The Renohill soils are moderately deep and fine textured and occur on ridgetops and ridgecrests. The Shingle and Terry soils are shallow and moderately deep, medium-textured to moderately coarse-textured soils of steeply sloping sidehills. Productivity potential is low and erodibility is high. The estimated acreage of this association is 148,224.

Renohill-Briggsdale-Ulm Association (No. 11)

This unit is represented by deep and moderately deep, well-drained loam, clay, and clay-loam soils on nearly level to sloping alluvial fans and nearly level to moderately steep uplands.

The Briggsdale and Renohill soils occur on nearly level to moderately steep uplands underlain by soft shale at depths of about 20 inches. The Ulm soils are situated on nearly level upland fans and terraces which are subject to short periods of overflow in the spring and summer. These soils have fine-textured subsoils which exhibit moderate to high shrink-swell potentials. The productivity potential and erodibility of these units are considered moderate. The acreage estimate of the association is 591,737.

Terry Association (No. 12)

This unit is dominantly moderately deep but includes deep to shallow, well to excessively drained, loamy fine sand, sandy loam, and fine, sandy loam soils on nearly level to moderately steep uplands underlain with sandstone. These soils are moderately to highly erodible and have low productivity potentials. The acreage estimate for this association is 37,239.

Shingle-Kim-Shale Rock Outcrops Association (No. 13)

This unit consists of a narrow band of rolling, gullied uplands on shale-sandstone foothills and stream terraces. Shingle soils are shallow and located on the steeper slopes. Kim soils are on alluvial fans. Vegetative production is poor. A moderate to severe erosion hazard exists. The estimated acreage of the association is 240,425.

Renohill-Ulm-Olney-Arvada-Bone Association (No. 14)

This unit consists of deep and moderately deep, medium to fine-textured soils on level to gentle slopes developed in alluvium, derived from shales, sandstone, and alkaline shales. Renohill soils are fine textured and underlain by soft shale at a depth of 20 to 40 inches. Ulm soils are fine textured and underlain by soft shale below 40 inches in depth. Olney soils are medium textured and underlain by sandstone at depths below 40 inches. Arvada and Bone soils are deep, strongly saline, impervious to water, and occur as alkali panspots. The productivity potential is low and erodibility is high. The estimated acreage is 171,557.

Renohill-Pugsley-Briggsdale Association (No. 15)

This unit includes moderately deep, nearly level to steep soils on uplands, upland ridges, ridgecrests, and sidehill slopes. The Renohill and Briggsdale are derived from shale; Pugsley soils form from sandstone. These soils are highly erodible and have low to moderate productivity potentials. The estimated acreage of the association is 70,246.

Renohill-Briggsdale-Ulm-Tassel-Rock Outcrop Association (No. 16)

This unit includes shallow, moderately deep and deep silty clays, loams, clay loams, and sandy loams on gently sloping to very steep slopes and rock outcrops.

The Renohill, Briggsdale, and Tassel soils are situated on moderately steep to steep uplands. Ulm soils are found on nearly level to sloping alluvial fans. The Briggsdale and Ulm soils exhibit moderate to high shrink-swell potentials. The Ulm soils are subject to short periods of overflow. The productivity potential is low to moderate and erodibility is high. This association contains an estimated 138,538 acres.

Shingle-Tassel-Dwyer-Olney-Bowbac Association (No. 17)

This unit consists of shallow to deep, sandy to medium-textured soils on rolling to steeply rolling slopes, including upland ridges and sidehills dissected by numerous drainages.

The Shingle and Tassel soils are generally less than 20 inches deep over sandstone and shale bedrock. Olney soils are more than 40 inches deep to sandstone bedrock. Bowbac soils are 20 to 40 inches deep to bedrock. Hummocks and dune topography are associated with the deep, sandy Dwyer soils. This unit is subject to severe wind erosion hazards and is moderately erodible by water. The productivity potential is low to moderate. The acreage estimation for the association is 309,742.

Dwyer-Tassel-Terry Association (No. 18)

This unit consists of deep to shallow, sandy soils on rolling uplands dissected by drainages.

The Dwyer soils are loamy sands, deeper than 40 inches to bedrock. The Tassel soils are less than 20 inches deep to sandstone bedrock and have sandy loam textures. The Terry soils are 20 inches to 40 inches deep to bedrock and have sandy loam textures. This unit is subject to severe wind erosion and is moderately erodible by water. The productivity potential is low. The acreage estimate for this association is 74,712.

Rauzi-Renohill-Arvada Association (No. 19)

These are moderately deep and deep, fine loamy and fine soils on rolling, steep slopes over interbedded sandstone and shale.

This association of soils occurs on moderately sloping hills, ridges, and alluvial fans underlain by soft shale at shallow depths. The Rauzi soils are deep and medium textured, formed from sandstone and shale; Renohill soils are moderately deep and fine textured developing in shale; Arvada soils are deep and saline-alkali developing on alluvial deposits. The erosion hazard is severe and the productivity potential is low. The estimated acreage of this association is 307,800.

Tassel-Shingle-Terry-Olney-Bowbac Association (No. 20)

This unit consists of shallow, moderately deep and deep, moderately sandy and loamy soils developed from sandstone and shale and occupying rolling to steep topography with gentle to steep slopes dissected by many small drainages. The Tassel and Shingle soils are shallow and occur on the steeply sloping uplands. The Olney, Bowbac, and Terry soils occur on side and foot slopes. The productivity potential is moderate. These soils are subject to severe wind erosion and moderate water erosion. The estimated acreage of the association is 444,450.

Valent-Dwyer-Duneland Association (No. 21)

This association occurs on undulating to rolling, hummocky dune topography and is made up of deep aeolain sands and some active dunes. The soils are excessively drained, deep, loose sands. Wind erosion is severe and water erosion is moderate. Productivity potential is moderate. The estimated acreage of this association is 98,912.

WATER RESOURCES

Groundwater

The yield of water from a well is often expanded as the number of gallons per minute for each foot of drawdown in the well. A well that yields 10 gallons per minute for each foot of drawdown is said to have a specific capacity of 10. Specific capacity is greatly dependent upon the ease with which water will pass through the formation (transmissivity) and an estimate of well yield can be obtained from transmissivity. There are several "rules of thumb"for this calculation, one of which states that when transmissivity is reported in square feet per day (as it is in Table RB-2), the yield of the well in gallons per minute per foot of drawdown can be obtained by dividing the transmissivity value by 250. It is emphasized this is an estimate; in addition to being dependent on transmissivity, the specific capacity depends on other factors such as well construction and time of pumping.

TABLE RB-1

SOIL INTERPRETATIONS FOR REGIONAL SOIL ASSOCIATION MAP 4, APPENDIX A

Soil Series Assoc. Occurrence	Classification	Typical Text. of Surface Layer	Parent Material	Natural Soil Drainage Class	Depth of Rooting Zone (in)	Available Water Capacity (in)	Permeability Least Perm. Layer(in/hr)	Potential Frost Action	Shrink-Swell Potential	Hydro-logic Soil Group
Arvada 14, 19	Ustollic Natrargid fine, montmorillonitic, mesic	Fine sandy loam	Alluvium	Well drained	60"	5-6"	0.06"	Low	High	D
Bankard 1	Ustic Torrifluvent sandy, mixed calcareous mesic	Loamy fine sand	Sandy Alluvium	Somewhat excessively drained	60"	3-4"	6.0-20.0"	Moderate	Low	A
Bone 14	Ustic Torriorthent fine, montmorillontic, (calcareous) mesic	Loam	Alluvium	Moderately well drained	60"	4-5"	0.06"	Moderate to high	High	D
Bowbac 3,7, 17, 20	Ustollic Haplargids fine loamy, mixed mesic	Sandy Loam	Alluvial sediments from inter-bedded shale and sandstone	Well drained	30"	4-5"	0.6-2.0"	Moderate	Low to Moderate	B
Briggsdale 11, 15, 16	Ustollic Paleargid fine, montmorillonitic, mesic	Loam	Inter-bedded sandstone & shale	Well drained	30"	4-6"	0.2-0.6"	High	Moderate	C
Cushman 6, 9	Ustollic Haplargid fine-loamy, mixed mesic	Sandy loam	Inter-bedded shale & sandstone	Well drained	30"	5-7"	0.2-0.6"	Low	Moderate	C
Dwyer 17, 18, 21	Ustic Torripsamments mixed, mesic	Fine sand	Aeolian sand	Excessively drained	60"	3-4"	6.0-20.0"	Low	Low	A
Haverson 1	Ustic Torrifluvent fine-loamy mixed (calcareous) mesic	Loam	Strati-fied alluvium	Well drained	60"	6-10"	0.6-2.0"	Low	Low	B

TABLE RB-1
(cont'd)

SOIL INTERPRETATIONS FOR REGIONAL SOIL ASSOCIATION MAP 4, APPENDIX A

Soil Series Assoc. Occurrence	Classification	Typical Text. of Surface Layer	Parent Material	Natural Soil Drainage Class	Depth of Rooting Zone (in)	Available Water Capacity (in)	Permeability Least Perm. Layer(in/hr)	Potential Frost Action	Shrink-Swell Potential	Hydro-logic Soil Group
Kim 1, 13	Ustic Torriorthent fine-loamy, mixed (calcareous) mesic	Loam	Alluvium	Well drained	60"	10-12"	0.6-2.0"	Low	Low	B
Maysdorf 3	Ustollic Haplargid fine-loamy, mixed	Sandy Loam	Alluvial	Well drained	60"	7-9"	0.6-2.0"	Moderate	Low to	B
Olney 3, 7, 14, 17, 20	Ustollic Haplargids fine-loamy, mixed mesic	Sandy Loam	Alluvial sediments from inter-bedded shale and sandstone	Well drained	60"	6-9"	0.6-2.0"	High	Low to moderate	B
Pugsley 15	Ustollic Haplargid, fine-loamy, mixed mesic	Sandy Loam	Sandstone	Well drained	24"	2-4"	2.0-6.0"	Moderate	Low to moderate	B
Rauzi 19	Ustollic Haplargid, fine-loamy mixed mesic	Sandy Loam	Alluvial sediments from inter-bedded shale and sandstone	Well drained	60"	7-9"	0.6-2.0"	Moderate	Low to moderate	B
Razor 2	Ustollic Camborthid, fine, montmorillonitic, mesic	Silty clay loam	Shale	Well drained	24"	3-4"	.06-0.2"	Moderate	High	C
Renohill 3, 5, 6, 7, 8, 9, 10, 11, 15, 16, 19	Ustollic Haplargids fine montmorillonitic mesic	Clay Loam	Shale	Well drained	30"	5-6"	0.06-0.2"	High	High	C

TABLE RB-1
(cont'd)

SOIL INTERPRETATIONS FOR REGIONAL SOIL ASSOCIATION MAP 4, APPENDIX A

Soil Series Assoc. Occurrence	Classification	Typical Text. of Surface Layer	Parent Material	Natural Soil Drainage Class	Depth of Rooting Zone (in)	Available Water Capacity (in)	Permeability Least Perm. Layer (in/hr)	Potential Frost Action	Shrink-Swell Potential	Hydro-logic Soil Group
Samsil 2, 3, 5, 7, 8, 10, 13, 14, 17, 20	Ustic Torriorthents clayey, mixed, calcareous, mesic, thin	Clay	Shale	Well drained	14"	2-3"	0.06-0.2"	High	High	C
Shingle 2, 3, 5, 7, 8, 10, 13, 17, 20	Ustic Torriorthents loamy, mixed (calcareous) mesic, shallow	Clay Loam	Inter-bedded sandstone, shale and loamstone	Well drained	15"	2-3"	0.2-0.6"	Low	Moderate	C
Tassel 8, 16, 17, 18, 20	Ustic Torriorthents loamy, mixed (calcareous) mesic, shallow	Fine sandy loam	Soft sandstone	Well drained	15"	1-2"	2.0-6.0"	Low	Low	D
Terry 5, 10, 12, 18, 20	Ustollic Haplargid coarse-loamy, mixed, mesic	Fine sandy loam	Soft sandstone	Well drained	36"	4-5"	2.0-6.0"	Moderate	Low	C
Ulm 3, 11, 14, 16	Ustollic Haplargids fine, montmorillonitic, mesic	Loam	Inter-bedded shale & sandstone	Well drained	60"	10-12"	0.6-2.0"	High	Moderate to high	B
Valent 21	Ustic Torripsamments mixed, mesic	Loamy sand	Aeolian sand	Excessively drained	60"	3-5"	6.0-20.0"	Low	Low	A
Wibaux 7, 8	Ustic Torriorthent loamy-skeletal over gragmental, mixed, nonacid, mesic	Channery loam	Channery material over scoria beds	Well to what excessively drained	15"	2-3"	0.6-2.0"	Low	Low	D
Wyarno 6	Ustollic Haplargid, fine, montmorillonitic, mesic	Clay Loam	Alluvium from shales	Well drained	60"	10-12"	0.2-0.6"	Moderate	High	B

TABLE RB-1
(cont'd)

SOIL INTERPRETATIONS FOR REGIONAL SOIL ASSOCIATION MAP 4, APPENDIX A

Soil Series Assoc. Occurrence	Erodi-bility	Inherent Fertility	Potential* Production (#/ac. dry wt)	Land Capa-bility Classifi-cation	Range Site	Final Cover for Mined Land: Inches Available	Final Cover for Mined Land: Suitability	Transpor-tation Routes	Depth of Surface Layer (inches)	Soil Reaction (pH)	Salinity (mmhos/cm)
	Degrees of Limitation for and Soil Features Affecting										
Arvada 14, 19	Very High	Low	1400-2200	VIs	Saline Lowland	60"	Poor, clay content alkali	Severe, high shrink-swell low strength	3-6"	7.4- 9.0	2-8
Bankard 1	Very High wind erosion	Low	2000-3000	IVe	Lowland	60"	Poor, sandy	Moderate, occasional flooding, moderate frost action	3-8"	7.9-8.4	2-8
Bone 14	Very High	Low	1400-2200	VIIs	Saline Lowland	60"	Poor, high clay content alkali	Severe, clay tex-ture, high shrink-swell	1"	9.2-9.6	2-8
Bowbac 3, 7, 17, 20	High Wind erosion	Medium	1000-2100	VIe	Sandy	30"	Fair, sandy loam	Moderate, bedrock at 20-40"	2-4"	7.0-8.4	2
Briggsdale 11, 15 16	High	Medium	850-2000	IVe	Loamy	36"	Poor-clay content	Severe, high frost action texture, plastic	3-8"	6.6-8.8	2
Cushman 6, 9	High	Medium	850-2000	VIe	Loamy	26"	Fair to good	Moderate low strength	1-3"	7.9-8.4	0-4
Dwyer 17, 18 21	Very high wind erosion	Low	1000-2100	VIe	Sandy	60"	Poor-sandy	Slight-slopes 8%, Moderate 8-15% slopes	4-8"	7.9-8.4	0-4

TABLE RB-1
(cont'd)

SOIL INTERPRETATIONS FOR REGIONAL SOIL ASSOCIATION MAP 4, APPENDIX A

Soil Series Assoc. Occurrence	Erodibility	Inherent Fertility	Potential* Production (#/ac. dry wt)	Land Capability Classification	Range Site	Final Cover for Mined Land: Inches Available	Final Cover for Mined Land: Suitability	Transportation Routes	Depth of Surface Layer (inches)	Soil Reaction (pH)	Salinity (mmhos/cm)
	Degrees of Limitation for and Soil Features Affecting										
Haverson 1	High wind if cultivated Low water erosion	Medium	2000-3000	IVe	Lowland	60"	Fair to Good	Moderate flooding low strength	3-6"	7.9-8.4	0-4
Kim 1, 13	High	Medium	850-2000	IVe	Loamy	60"	Fair to Good	Moderate, 8%, severe, slopes 8%	6-9"	7.9-8.4	0-4
Maysdorf 3	Medium	Medium	1000-2100	VIe	Sandy	50"	Fair to Good	Moderate, moderate frost action	4-6"	6.6-8.4	<2
Olney 3, 7, 14, 17, 20	Medium	Medium to high	1000-2100	VIe	Sandy	50"	Fair to Good	Severe, frost action	2-4"	7.0-8.4	2-4
Pugsley 15	Medium	Medium	1000-2100	VIe	Sandy	24"	Fair	Moderate, bedrock at 20-40"	2-4"	6.6-7.3	<2
Rauzi 19	Medium	Medium	1000-2100	VIe	Sandy	60"	Fair	Moderate frost action	4-6"	6.6-7.0	<2
Razor 2	High	Low	750-1800	IVe	Clayey	30"	Poor, clay content	Severe, high shrink-swell potential	2-4"	8.2-8.6	2-4

TABLE RB-1
(cont'd)

SOIL INTERPRETATIONS FOR REGIONAL SOIL ASSOCIATION MAP 4, APPENDIX A

Soil Series Assoc. Occurrence	Erodi-bility	Inherent Fertility	Potential* Production (#/ac. dry wt)	Land Capa-bility Classifi-cation	Range Site	Final Cover for Mined Land: Inches Available	Final Cover for Mined Land: Suitability	Transpor-tation Routes	Depth of Surface Layer (inches)	Soil Reaction (pH)	Salinity (mmhos/cm)
				Degrees of Limitation for and Soil Features Affecting							
Renohill 3, 5, 6, 7, 8, 9, 10, 11, 15, 16, 19	High	Medium	750-1800	VIe	Clayey	25"	Poor, clay content	Severe, high shrink-swell potential	3-6"	7.0-8.6	<2
Samsil 2, 3, 5, 7, 8, 10, 13, 14, 17, 20	Very High	Medium	600-1100	VIIe	Shallow clayey	14"	Poor clayey shallow to bedrock	Severe, high shrink-swell potential	3-6"	7.4-9.0	0-4
Shingle 2, 3, 5, 7, 8, 10, 13, 17, 20	Very High	Low	450-1200	VIIe	Shallow loamy	18"	Poor, shallow depth to bedrock	Severe 4-15% slopes, low strength, Severe, 15-50% slopes, low strength and slope	3-6"	7.9-9.0	0-4
Tassel 8, 16, 17, 18, 20	Very high erosion	Low	600-1400	VIIe	Shallow sandy	18"	Poor sandy, shallow depth to bedrock	Severe, Bedrock at 10-20 inches	3-9"	7.9-8.4	0-4
Terry 5, 10, 12, 18, 20	High wind erosion	Low	1000-2100	VIe	Sandy	26"	Fair	Moderate, bedrock at 20-40"	4-6"	6.8-8.6	<2

TABLE RB-1
(cont'd)

SOIL INTERPRETATIONS FOR REGIONAL SOIL ASSOCIATION MAP 4, APPENDIX A

Soil Series Assoc. Occurrence	Erodi-bility	Inherent Fertility	Potential* Production (#/ac. dry wt)	Land Capa-bility Classifi-cation	Range Site	Final Cover for Mined Land: Inches Available	Final Cover for Mined Land: Suitability	Transpor-tation Routes	Depth of Surface Layer (inches)	Soil Reaction (pH)	Salinity (mmhos/cm)
	Degrees of Limitation for and Soil Features Affecting										
Ulm 3, 11, 14, 16	High	Medium	850-2000	IVe	Loamy	60"	Poor clay content	Severe, high frost action potential	3-6"	6.6-8.6	2
Valent 21	Very high wind erosion	Low	1000-2100	VIe	Sandy	60"	Poor	Slight- 8% slopes Moderate- 8-15% slopes Severe- 15% slopes	3-5"	7.9-8.4	0-4
Wibaux 7, 8	High	Low	450-1200	VIIs	Shallow loamy	15"	Poor, very gravelly	Severe, bedrock at 10-20" steep slopes	2-4"	7.8-8.6	<2
Wyarno 6	Medium	Medium	750-1800	IVs	Clayey	60"	Poor, clay content	Severe, high shrink-swell potential	3-7"	6.8-8.6	<2

Table RB-1
(cont'd)

SOIL INTERPRETATIONS FOR REGIONAL SOIL ASSOCIATION MAP 4, APPENDIX A

*Low figure for unfavorable years, high figure for favorable years, normal years are average of high and low. Definitions applicable to the columns of the Soil Interpretations for Regional Soil Association Map.

Soil Series name and the distribution of the soil series within the different soil associations of the Powder River Basin study area.

Classification given is according to Soil Taxonomy for each series.

Typical texture of the surface refers to the relative proportions of the various size groups of individual soil grain, i.e. sands, silt, and clay.

Parent Material is the assumed geologic material the soil developed from.

Natural Soil Drainage Class is an expression of surface soil moisture relationships.

Depth of Rooting Zone is an indicator of the thickness plant roots can penetrate.

Available Water Capacity refers to the potential amount of water a soil can hold for plant use.

Permeability least Permeable layer is the rate at which water and air may move through the soil.

Potential Frost Action refers to the probable effects on structures results from the freezing of soil material.

Shrink-Swell Potential refers to the quality of a soil that determines its volume change resulting from wetting and drying.

Hydrologic Soil Groups are ranking of soils from A to D referring to runoff potential ranging from A, having the lowest rates to D with the highest rates.

Erodibility Class - The susceptibility of a soil to erosion when no cover is present. Rate of soil displacement is influenced primarily by soil qualities, physical properties, rainfall intensity, and slope gradient. Considered was each of six items listed within each of the three classes when classifying the area. Classes and rating items are as follows:

Class

Low
- Potential erosion is not significant to reduce productivity.
- They contain water stable aggregates.
- They have good infiltration and percolation rates.
- They have adequate depth to store most of the normal precipitation.
- They contain no restrictive layers.
- They occur on gentle slopes.

Medium
- Potential erosion is significant to reduce productivity but not to the point of entirely restricting production.
- They contain aggregates that are not water stable.
- They have moderate infiltration and percolation rates.
- They have moderate depths to store only part of the normal precipitation (AWC).
- They may contain restrictive layers.
- They occur on moderate slopes.

TABLE RB-1
(cont'd)

SOIL INTERPRETATIONS FOR REGIONAL SOIL ASSOCIATION MAP 4, APPENDIX A

High
- Potential erosion will cause a reduction in productivity to practically zero.
- They contain very unstable aggregates.
- They have slow infiltration and percolation rates.
- They have little soil for water storage.
- They contain restrictive layers.
- They occur on steep slopes.

Where wind erosion is a hazard, it is mentioned specifically.

Inherent fertility - the following criteria were used for rating the soils:

Low — Soils low in available P or K, or with pH below 5.0 in the A and upper B horizons, or soils having levels of alkalinity or salinity such that choice of plants or growth of plants is severly limited.

Medium — Soils intermediate between low and high in inherent fertility.

High — Soils high in available P and K, with pH of 5.5 or more in A and upper B horizons, levels of salinity or alkalinity are sufficiently low that choices or growth of plants are not limited.

The degrees of limitation for Irrigation, Dwelling, and Transportation Routes are listed as slight, moderate or severe and give restrictive features if degree of limitation is other than slight. The definition of limitations are listed below.

Definition of Limitations

Slight soil limitation is the rating given soils that have properties favorable for the rated use. The degree of limitation is minor and can be overcome easily. Good performance and low maintenance can be expected.

Moderate soil limitation is the rating given soils that have properties moderately favorable for the rated use. This degree of limitation can be overcome or modified by special planning, design or maintenance. Some soils rated moderate require treatment such as artificial drainages, runoff control to reduce erosion, extended sewage absorption fields, extra excavation or some modification of certain features through manipulation of the soil.

Severe soil limitation is the rating given soils that have one or more properties unfavorable for the rated use such as steep slopes, bedrock near the surface, high shrink-swell potential, a seasonal high water table, flooding hazard or low bearing strength. This degree of limitation generally requires major soil reclamation, special design or intensive maintenance. Some of these soils, however, can be improved by reducing or removing the soil feature that limits use, but in most situations, it is difficult and costly to alter the soil or to design a structure so as to compensate for a severe degree of limitation.

Depth of surface layer (inches) refers to depth of darker colored A horizon in inches.

Soil reaction (pH) The degree of acidity or alkalinity of a soil expressed as a pH value. Descriptive terms commonly associated with certain ranges in pH are: slightly acid, 6.1-6.5; neutral, 6.6-7.3; slightly alkaline, 7.4-7.8; moderately alkaline 7.9-8.4; strongly alkaline, 8.5-9.0; and very strongly alkaline, 9.1.

Salinity (mmhos/cm) refers to the soluble salts in a soil, based on the electrical conductivity of the saturation extract, as expressed in millimhos per centimeter (mmhos/cm) at 25C.

Salinity Rating	mmhos/cm
Low	4
Moderate	4-8
High	8

TABLE RB-2

AQUIFER TESTS IN THE FOX HILLS SANDSTONE, THE LANCE, FORT UNION, AND WASATCH FORMATIONS, AND THE ALLUVIUM IN THE POWDER RIVER BASIN OF WYOMING

CAMPBELL COUNTY

Location (Township, Range, Section)	Owner Number	Transmissivity (ft^2/day)	Conductivity (Permeability) (ft/day)	Storage	Lithology	Source of Data
Fox Hills--Lance						
50-69-18 NE SW	Rozet #5	46	-	-	Sandstone	Company
Fort Union						
45-70-04 NW NW NW	CCR-3	32.08	-	-	Coal	Company
45-70-04 NW SE SE	CCR-2	1.34	-	-	Coal	Company
45-70-04 NW SE SE	CCR-2a	5.35	-	-	Coal	Company
46-70-18 NE NE NE	CCR-27	51.87	-	.000125	Coal	Company
46-70-18 NE NE NE	CCR-27a	61.76	-	-	Coal	Company
46-70-18 SW SW NE	CCR-24	343.58	-	-	Coal	Company
46-70-18 SE SE SE	CCR-21	401.07	-	-	Coal	Company
46-70-19 SW SW NE	CCR-17	1,470.59	-	-	Coal	Company
46-70-19 SW SW NE	CCR-17a	1,470.59	-	.000567	Coal	Company
46-70-19 SE SE SE	CCR-14	116.98	-	-	Coal	Company
46-70-19 SE SE SE	CCR-14a	110.29	-	.00050	Coal	Company

TABLE RB-2
(cont'd)

AQUIFER TESTS IN THE FOX HILLS SANDSTONE, THE LANCE, FORT UNION, AND WASATCH FORMATIONS, AND THE ALLUVIUM IN THE POWDER RIVER BASIN OF WYOMING
CAMPBELL COUNTY (cont'd)

Location (Township, Range, Section)	Owner Number	Transmissivity (ft^2/day)	Conductivity (Permeability) (ft/day)	Storage	Lithology	Source of Data
Fort Union (cont'd)						
46-70-19 SE SE SE	CCR-14c	155.75	-	.00146	Coal	Company
46-70-20 NE NE SW	CCR-18	22.73	-	-	Coal	Company
46-70-20 SW SW SW	CCR-14b	80.21	-	.00056	Coal	Company
46-70-27 SE SE NW	CCR-13	213.90	-	-	Coal	Company
46-70-28 NE NE NE	CCR-16	25.40	-	-	Coal	Company
46-70-29 NE NE SW	CCR-11	12.03	-	-	Coal	Company
46-70-29 SW SW SW	CCR-8	802.14	-	.000346	Coal	Company
46-70-29 SW SW SW	CCR-8a	815.51	-	-	Coal	Company
46-70-29 SE SE SE	CCR-9	110.29	-	-	Coal	Company
46-70-32 NW NW SE	CCR-5	306.15	-	-	Coal	Company
46-70-32 NW NW SE	CCR-5a	447.86	-	.000161	Coal	Company
46-70-33 SW SW NE	CCR-6	.40	-	-	Coal	Company
46-70-34 NW NW NW	CCR-10	362.30	-	-	Coal	Company
46-70-34 NE NE SW	CCR-7a	10,026.74	-	-	Coal	Company

TABLE RB-2
(cont'd)

AQUIFER TESTS IN THE FOX HILLS SANDSTONE, THE LANCE, FORT UNION, AND WASATCH FORMATIONS, AND THE ALLUVIUM IN THE POWDER RIVER BASIN OF WYOMING
CAMPBELL COUNTY (cont'd)

Location (Township, Range, Section)	Owner Number	Transmissivity (ft^2/day)	Conductivity (Permeability) (ft/day)	Storage	Lithology	Source of Data
Fort Union (cont'd)						
46-70-34 SW SW SW	CC-4a	11.76	-	-	-	Company
47-71-04 SW SE SE	-	526.74	8.9	-	Coal	Company
48-71	-	295.72	-	-	Coal	Company
48-71-27 NW NW SE	WRRI-7	295.86	-	.0834	-	Company
50-71	EG40C-8	22.06	1.11	.0002	Coal	Company
50-71-05 SE SE NW	EG1-2	26.74	1.74	.35	Coal	Company
50-71-05 SE SE NW	EG6-AC	1.74	.016	.0014	Coal	Company
50-71-05 SE SE NW	EG6B	8.42	.08	.0012	Coal	Company
50-71-06 NE SW NW	EG4	14.17	.71	.000001	Coal	Company
50-71-06 SW SW SW	EG5C	1.60	.08	.00001	Coal	Company
50-71-17 NE NW NE	EG3-3	48.26	.48	.00078	Coal	Company
50-71-17 SE SE NW	EG9C	.67	.03	.00010	Coal	Company
50-71-17 SW SE SE	EG3-4	52.41	.52	.0012	Coal	Company

TABLE RB-2
(cont'd)

AQUIFER TESTS IN THE FOX HILLS SANDSTONE, THE LANCE, FORT UNION, AND WASATCH FORMATIONS, AND THE ALLUVIUM IN THE POWDER RIVER BASIN OF WYOMING
CAMPBELL COUNTY (cont'd)

Location (Township, Range, Section)	Owner Number	Transmissivity (ft^2/day)	Conductivity (Permeability) (ft/day)	Storage	Lithology	Source of Data
Fort Union (cont'd)						
50-71-21 NE SW SE	EG17C	9.89	.49	.01	Coal	Company
50-71-22 NE SW	Wyodak #7	108.29	3.88	.00009	Sandstone	USGS
50-71-27 NE NE NW	Wyodak #5	160.43	1.74	.00010	Sandstone	USGS
50-71-27 NW SW NW	Wyodak #6	128.34	1.87	.000075	Sandstone	USGS
50-71-29 SE NE	EG16AF	49.60	2.54	.00001	Sandstone	Company
50-71-29 SE NE	EG16AC	1,167	12.43	.33	Coal	Company
50-71-29 SE NE	EG16B	189.84	1.87	.0058	Coal	Company
50-71-29 SE NE	EG16C	189.84	1.87	.0058	Coal	Company
50-71-29 SW SE SW	EG18C	.13	.007	.001	Coal	Company
51-72-11 SW	-	15.37	-	.00020	Coal	Company
51-72-11 SW	-	41.44	-	.0030	Coal	Company
51-72-27	D305A	187.16	-	.00016	Coal	Company
52-72-32 SE NE	P-27	668.45	6.31	.00073	Coal	Company

TABLE RB-2
(cont'd)

AQUIFER TESTS IN THE FOX HILLS SANDSTONE, THE LANCE, FORT UNION, AND WASATCH FORMATIONS, AND THE ALLUVIUM IN THE POWDER RIVER BASIN OF WYOMING
CAMPBELL COUNTY (cont'd)

Location (Township, Range, Section)	Owner Number	Transmissivity (ft^2/day)	Conductivity (Permeability) (ft/day)	Storage	Lithology	Source of Data
Fort Union (cont'd)						
52-72-32 SE NE	P-27	1,229.95	11.60	.00049	Coal	Company
52-72-32 SE SW	CT-1	-	-	-	Coal	Company
52-72-32 SE SW	P-17	582.89	4.66	.00049	Coal	Company
52-72-32 SE SW	P-18	582.89	4.32	.0011	Coal	Company
52-72-32 SE SW	P-19	582.89	4.48	.0011	Coal	Company
Fort Union--Wasatch						
52-72-32 SE NE	CT-2	668.45	4.68	-	Sandstone and coal	Company
52-72-32 SE NE	P-26	855.61	5.82	.00073	Sandstone and coal	Company
52-72-32 SE NE	P-26	895.72	6.10	.00048	Sandstone and coal	Company
52-72-32 SE NE	P-29	788.77	5.63	.00047	Sandstone and coal	Company
52-72-32 SE NE	P-29	895.72	6.40	.00038	Sandstone and coal	Company

TABLE RB-2
(cont'd)

AQUIFER TESTS IN THE FOX HILLS SANDSTONE, THE LANCE, FORT UNION, AND WASATCH FORMATIONS, AND THE ALLUVIUM IN THE POWDER RIVER BASIN OF WYOMING
CAMPBELL COUNTY (cont'd)

Location (Township, Range, Section)	Owner Number	Transmissivity (ft^2/day)	Conductivity (Permeability) (ft/day)	Storage	Lithology	Source of Data
Fort Union--Wasatch (cont'd)						
52-72-32 SE NE	P-30	868.98	5.08	.00089	Sandstone and coal	Company
52-72-32 SE NE	P-30	895.72	5.24	.00085	Sandstone and coal	Company
Wasatch						
47-71-04 SW SE SE	-	53.48	.54	-	-	USGS
47-72-07	-	-	-	-	Coal	USGS
48-71-05 SE SE SE	Belle Ayr N-5	868.98	-	.00010	Sandstone	Company
50-71-29 SW SE SW	EG18W	5.08	.25	.003	Shale	Company
50-72-35 SE SE	-	91.84	-	-	Sandstone	Company
52-72-32 SE NE	P-28	962.57	19.25	.00073	Sandstone	Company
52-72-32 SE NE	P-28	1,229.95	24.60	.00058	Sandstone	Company
Alluvium						
51-72-05 NE NW	OT-2B	449.20	22.46	-	-	Company
51-72-05 NE NW	P-24	1,203.21	52.27	.060	-	Company
51-72-05 NE NW	P-25	1,336.90	66.84	.035	-	Company

TABLE RB-2
(cont'd)

AQUIFER TESTS IN THE FOX HILLS SANDSTONE, THE LANCE, FORT UNION, AND WASATCH FORMATIONS, AND THE ALLUVIUM IN THE POWDER RIVER BASIN OF WYOMING
CROOK COUNTY

Location (Township, Range, Section)	Owner Number	Transmissivity (ft^2/day)	Conductivity (Permeability) (ft/day)	Storage	Lithology	Source of Data
Lance						
49-68-36 NW SE	-	22.73	.80	-	-	USGS
50-68-14 SE SW	-	141.7	3.48	-	-	USGS
50-68-24 SE SW	-	280.75	4.68	-	-	USGS
Fort Union						
49-68-16 NE SW	-	57.49	.69	-	-	USGS
49-68-27 SW NW	-	8.02	.07	-	-	USGS
49-68-28 NW NE	-	21.39	.80	-	-	USGS
49-68-29 SW NW	-	4.01	.07	-	-	USGS
Alluvium						
50-67-04 SW SW	-	1,470.59	77.54	-	-	USGS
50-67-05 SW SE	-	45.45	1.87	-	-	USGS
54-65-13 NE NW	-	2,754.0	81.55	-	-	USGS
55-64-32 NW SW	-	28.07	6.95	-	-	USGS

TABLE RB-2
(cont'd)

AQUIFER TESTS IN THE FOX HILLS SANDSTONE, THE LANCE, FORT UNION, AND WASATCH FORMATIONS, AND THE ALLUVIUM IN THE POWDER RIVER BASIN OF WYOMING

JOHNSON COUNTY

Location (Township, Range, Section)	Owner Number	Transmissivity (ft^2/day)	Conductivity (Permeability) (ft/day)	Storage	Lithology	Source of Data
Wasatch						
51-82-33 SE SE	-	334.22	2.27	-	-	USGS

NATRONA COUNTY

Location (Township, Range, Section)	Owner Number	Transmissivity (ft^2/day)	Conductivity (Permeability) (ft/day)	Storage	Lithology	Source of Data
Fox Hills						
40-78-15 NW NE	-	213.90	-	.37	Sandstone	Wyoming State

NIOBRARA COUNTY

Location (Township, Range, Section)	Owner Number	Transmissivity (ft^2/day)	Conductivity (Permeability) (ft/day)	Storage	Lithology	Source of Data
Alluvium						
38-63-30 SE SW	-	4,411.76	-	-	-	USGS

TABLE RB-2
(cont'd)

AQUIFER TESTS IN THE FOX HILLS SANDSTONE, THE LANCE, FORT UNION, AND WASATCH FORMATIONS, AND THE ALLUVIUM IN THE POWDER RIVER BASIN OF WYOMING
SHERIDAN COUNTY

Location (Township, Range, Section)	Owner Number	Transmissivity (ft^2/day)	Conductivity (Permeability) (ft/day)	Storage	Lithology	Source of Data
Fort Union						
54-84-05 NE SE	-	12.70	1.06	.00035	Sandstone	USGS
55-84-27 SW NW	-	1.34	.33	.000090	Sandstone	USGS
Wasatch						
54-81-14 SW NW	-	69.52	.87	.024	Coal	USGS
57-83-14 NE NW	-	294.11	-	-	Sandstone	USGS
Alluvium						
56-82-34 SW SE	-	1,297.0	51.0	-	-	USGS
57-85-19 NW NE	-	2,714.0	147.0	-	-	USGS
Spoil						
57-84-22 SE SW	-	22.99	.53	.233	-	SDSM*
57-85-01 NW SE	-	1,103.88	60.16	.128	-	SDSM

* South Dakota School of Mines (Rahn 1977)

TABLE RB-3

TYPICAL CLASSES OF ORGANIC COMPOUNDS
FOUND IN THE MAJOR AND MINOR FRACTIONS

Major/Minor Fractions	Hydrophobic	Hydrophillic
Acid	Aliphatic acids <5 carbons, aromatic acids, and high molecular weight phenols.	Polyfunctional acids, carboxylic and dicarboxylic acids, and hydroxy acids.
Basic	Aromatic bases.	Polyfunctional aliphatic bases.
Neutral	High molecular weight hydrocarbons, polynuclear aromatics, and high molecular weight alcohols, aldehydes, ketones, amides, and nitriles.	Polyfunctional and lower molecular weight alcohols, aldehydes, ketones, amides, and nitriles.

Source: Reports of Geological Survey

TABLE RB-4

DISSOLVED ORGANIC CARBON FRACTIONS FOUND IN WATER
IN CAMPBELL COUNTY, WYOMING
Results in mg/l

HYDROPHOBIC

Station Number	Acid	Base	Neutral
1	1.3	<0.1	0.3
2	1.5	<0.1	0.3
3	2.8	<0.1	0.8
4	2.6	<0.1	1.4

HYDROPHILLIC

Station Number	Acid	Base	Neutral
1	1.0	0.1	0.4
2	2.0	0.2	0.3
3	4.0	0.3	0.5
4	2.7	0.3	0.3

Source: Reports of Geological Survey

TABLE RB-5
STREAMFLOW CHARACTERISTICS AT GAGING STATIONS

Station Number* and Type	Station Name	Drainage Area (sq. mi.)	Records Available (years)	Annual Mean Discharge (cfs) Average	Annual Mean Discharge (cfs) Range	Range of Annual Minimum Daily Discharge (cfs)
06312910 S-R	Dead Horse Creek tributary near Midwest	1.53	1965-72	-	-	0-0
06312920 S-R	Dead Horse Creek tributary No. 2 near Midwest	1.34	1965-72	-	-	0-0
06313000 C	South Fork Powder River near Kaycee	1,150	1938-40, 1950-69	36.2	10.5-109	0-4.6
06313020 S-R	Bobcat Creek near Edgerton	8.29	1965-73	-	-	0-0
06313050 S-R	East Teapot Creek near Edgerton	5.44	1965-72	-	-	0-0
06313100 C-S	Coal Draw near Midwest	11.4	1961-	-	-	0-0
06313180 S-R	Dugout Creek tributary near Midwest	.71	1965-73	-	-	0-0
06313200 C-S	Hay Draw near Midwest	1.60	1958-70	-	-	0-0
06313700 C-S, C	Dead Horse Creek near Buffalo	155	C-S 1958-71, C 1971-	-	-	0-0
06316480 S-R	Headgate Draw at upper station near Buffalo	3.32	1965-73	-	-	0-0

TABLE RB-5
(cont'd)
STREAMFLOW CHARACTERISTICS AT GAGING STATIONS

Station Number* and Type	Station Name	Drainage Area (sq. mi.)	Records Available (years)	Annual Mean Discharge (cfs)		Range of Annual Minimum Daily Discharge (cfs)
				Average	Range	
06316700 S-R	Powder River tributary near Buffalo	1.64	1965-73	-	-	0-0
06317000 C	Powder River at Arvada	6,050	1930-33, 1934-	272	70.3-668	0-24
06317050 C-S	Spotted Horse Creek tributary near Spotted Horse	4.28	1961-	-	-	0-0
06324800 C-S	Little Powder River tributary near Gillette	.81	1960-	-	-	0-0
06324810 S-R	Box Draw tributary near Gillette	.5	1965-72	-	-	0-0
06324900 C-S	Little Powder River tributary No. 2 near Gillette	3.95	1959-	-	-	0-0
06325000 C	Little Powder River at Biddle, Montana	1,541	1938-43	-	20.5-30.2	0-0
06334000 C	Little Missouri River near Alzada	904	1911-25, 1928-32, 1935-69	77.2	1.92-324	0-.1
06363700 C-S	Porcupine Creek near Turnercrest	31.5	1959-	-	-	0-0
06378640 C-S	Lance Creek tributary near Lance Creek	1.2	1965-	-	-	0-0

TABLE RB-5
(cont'd)
STREAMFLOW CHARACTERISTICS AT GAGING STATIONS

Station Number* and Type	Station Name	Drainage Area (sq. mi.)	Records Available (years)	Annual Mean Discharge (cfs) Average	Annual Mean Discharge (cfs) Range	Range of Annual Minimum Daily Discharge (cfs)
06379600 C, C-S	Box Creek near Bill	112	C 1956-58, C-S 1959-	-	-	0-0
06382200 S-R	Pritchard Draw near Lance Creek	5.1	1965-	-	-	0-0
06386000 C	Lance Creek at Spencer	2,070	1948-54, 1956-	26.3	2.74-73.9	0-0
06386500 C	Cheyenne River near Spencer	5,270	1948-	59.4	5.95-283	0-0
06426000 C	Belle Fourche River near Moorcroft	1,380	1923-33	67.8	3.0-244	0-.3
06426200 C-S	Donkey Creek tributary near Gillette	.28	1960-	-	-	0-0
06426500 C	Belle Fourche River below Moorcroft	1,670	1924-70	21.0	1.14-104	0-0
06644840 S-R	McKenzie Draw tributary near Casper	2.02	1965-73	-	-	0-0
06648720 S-R	Frank Draw tributary near Orpha	.79	1965-73	-	-	0-0
06648780 S-R	Sage Creek tributary near Orpha	1.38	1965-73	-	-	0-0

TABLE RB-5
(cont'd)
STREAMFLOW CHARACTERISTICS AT GAGING STATIONS

Station Number* and Type	Station Name	PEAK FLOWS: Average Recurrence Interval (years) 2	5	10	25	50	Maximum Observed: Date	Discharge (cfs)	Unit Discharge (cfs/sq mi)	Factors Affecting Natural Flow
06312910 S-R	Dead Horse Creek tributary near Midwest	388	1,130	2,170	-	-	6-20-69	3,020	2,000	
06312920 S-R	Dead Horse Creek tributary No. 2 near Midwest	226	550	922	-	-	6-4-72	1,470	1,100	
06313000 C	South Fork Powder River near Kaycee	2,630	8,150	14,900	28,600	43,800	5-22-62	35,500	30.9	
06313020 S-R	Bobcat Creek near Edgerton	24	260	850	-	-	9-11-73	1,070	129	
06313050 S-R	East Teapot Creek near Edgerton	320	1,300	2,700	-	-	6-10-65	4,450	818	
06313100 C-S	Coal Draw near Midwest	696	1,900	2,730	-	-	6-22-64	2,620	230	
06313180 S-R	Dugout Creek tributary near Midwest	251	635	1,050	-	-	7-15-67	1,590	2,239	
06313200 C-S	Hay Draw near Midwest	300	634	920	1,350	-	7-15-67	900	562	
06313700 C-S, C	Dead Horse Creek near Buffalo	822	1,560	2,040	2,600	-	5-26-62	2,300	14.8	
06316480 S-R	Headgate Draw at upper station near Buffalo	200	1,900	4,600	-	-	6-15-65	5,490	1,650	

TABLE RB-5
(cont'd)
STREAMFLOW CHARACTERISTICS AT GAGING STATIONS

Station Number* and Type	Station Name	PEAK FLOWS: Average Recurrence Interval (years) 2	5	10	25	50	Maximum Observed: Date	Discharge (cfs)	Unit Discharge (cfs/sq mi)	Factors Affecting Natural Flow
06316700 S-R	Powder River tributary near Buffalo	258	1,100	2,250	-	-	6-16-65	2,290	1,400	
06317000 C	Powder River at Arvada	7,330	14,700	22,200	36,000	50,500	9-29-23	100,000	16.5	Irrigation diversions, numerous reservoirs.
06317050 C-S	Spotted Horse Creek tributary near Spotted Horse	91	412	985	2,660	-	6-13-62	3,120	729	
06324800 C-S	Little Powder River tributary near Gillette	-	-	-	-	-	6-22-64	176	218	
06324810 S-R	Box Draw tributary near Gillette	10	60	150	-	-	5-22-68	84	168	
06324900 C-S	Little Powder River tributary No. 2 near Gillette	168	350	502	725	-	6-22-64	758	192	
06325000 C	Little Powder River at Biddle, Montana	0	0	0	0	0	8-17-40	5,700	3.70	Small diversions for irrigation of hay meadows above station
06334000 C	Little Missouri River near Alzada, Montana	1,940	3,350	4,220	5,210	5,860	4-4-44	6,000	6.64	Do.
06363700 C-S	Procupine Creek near Turnercrest	-	-	-	-	-	6-15-62	1,230	39.0	

TABLE RB-5
(cont'd)
STREAMFLOW CHARACTERISTICS AT GAGING STATIONS

Station Number* and Type	Station Name	PEAK FLOWS: Average Recurrence Interval (years) 2	5	10	25	50	Maximum Observed: Date	Discharge (cfs)	Unit Discharge (cfs/sq mi)	Factors Affecting Natural Flow
06378640 C-S	Lance Creek tributary near Lance Creek	60	331	744	-	-	9-3-68	1,060	883	
06379600 C, C-S	Box Creek near Bill	145	692	1,560	3,660	-	5-5-71	1,720	15.4	
06382200 S-R	Pritchard Draw near Lance Creek	763	2,140	3,420	-	-	9-3-68	4,050	794	
06386000 C	Lance Creek at Spencer	1,970	3,600	4,790	6,340	7,500	5-24-71	7,410	3.58	Numerous small reservoirs, diversions for irrigation of 3,500 acres.
06386500 C	Cheyenne River near Spencer	3,160	6,620	9,820	15,000	19,900	5-27-62	16,000	3.04	Numerous small reservoirs, diversions for irrigation of 6,860 acres.
06426000 C	Belle Fourche River near Moorcroft	2,000	7,000	11,000	-	-	4-7-24	12,500	9.06	Numerous small reservoirs, diversions for irrigation.
06426200 C-S	Donkey Creek tributary near Gillette	34	57	84	137	-	7-22-66	165	589	
06426500 C	Belle Fourche River below Moorcroft	898	2,040	3,050	4,600	5,950	4-7-24	12,500	7.49	Numerous small reservoirs, diversions for irrigation.

TABLE RB-5
(cont'd)
STREAMFLOW CHARACTERISTICS AT GAGING STATIONS

Station Number* and Type	Station Name	PEAK FLOWS: Average Recurrence Interval (years) 2	5	10	25	50	Maximum Observed: Date	Discharge (cfs)	Unit Discharge (cfs/sq mi)	Factors Affecting Natural Flow
06644840 S-R	McKenzie Draw tributary near Casper	32	212	540	-	-	9- -73	970	480	
06648720 S-R	Frank Draw tributary near Orpha	50	212	408	-	-	8-19-66	342	433	
06648780 S-R	Sage Creek tributary near Orpha	22	94	181	-	-	7-25-65	229	166	

Source: Reports of the Geological Survey

* Refer to Figure R2-16.

C: continuous record gaging station.

C-S: partial-record gage for determining peak flows.

S-R: partial-record gage for determining rainfall-runoff relations.

TABLE RB-6
SUSPENDED SEDIMENT DATA

Station Number*	Station Name	Period of Record	Observed Daily Values					
			Date	Flow (cfs)	Maximum Concentration (mg/l)	Date	Flow (cfs)	Maximum Load (tons/day)
06313100	South Fork Powder River near Kaycee	1950-53	9/7/51	852	94,800	5/22/52	4,260	1,270,000
06313500	Powder River at Sussex	1950-53	8/3/53	1,090	87,500	5/23/52	14,100	2,850,000
06317000	Powder River at Arvada	1947-57 1968	7/19/54	792	113,000	5/24/52	12,500	2,340,000
06334000	Little Missouri River near Alzada, Montana	1949-52	5/21/49	57	20,300	5/10/50	1,180	17,600
06386000	Lance Creek near Spencer	1950-54, 1957-59	7/19/54	74	57,700	6/27/52	3,620	281,000
06394000	Beaver Creek near Newcastle	1949-57	5/22/57	134	36,000	5/25/57	780	90,800
06426500	Belle Fourche River below Moorcroft	1947-52	---	-	-	9/5/51	710	12,400

Source: Reports of the Geological Survey.

* Refer to Figure R2-16.

TABLE RB-7
CHEMICAL QUALITY DATA

Station Number	Station Name	Period of Record (month/year)	Dissolved Calcium (Ca) (mg/l) Max	Min	Dissolved Magnesium (Mg) (mg/l) Max	Min	Dissolved Sodium (Na) (mg/l) Max	Min	Dissolved Bicarbonate (HCO_3) (mg/l) Max	Min	Dissolved Sulfate (SO_4) (mg/l) Max	Min	Dissolved Solids (mg/l) Max	Min	Temperature (Degrees C.) Max	Min
06313400	Salt Creek near Sussex, Wyoming (sampled about monthly)	10/67 to 09/75	582	23	179	6.8	2,000	82	1,410	172	1,900	76	5,660	2,640	31.0	.0
			0.1*	25*	9.0*	0.1*	12*	11*	12*	0.1*	26*	18*	26*	137*	16*	9.1-46*
06324830	Rawhide Creek** at U.S. Highway 14/16 Wy. (3 samples)	03/75 to 08/76	400	390	490	470	685	650	638	334	4,000	780	5,890	1,410	25.0	20.3
			-*	.18*	-*	.18*	-*	-*	-*	6.7*	9.6*	1.0*	.18*	6.7*	.18*	6.7*
06324890	Little Powder River** below Corral Creek, Wy. (3 samples)	06/75 to 11/76	420	330	190	150	150	130	296	280	1,900	1,500	2,890	2,310	24.0	4.0
			9.6*	1.0*	9.6*	1.0*	9.6*	1.0*	9.6*	1.0*	9.6*	1.0*	9.6*	1.0*	.73*	1.0*
06324912	Little Powder River** above Cottonwood Creek, Wy (3 samples)	06/75 to 11/76	410***		190***		150***		297***		1,900***		2,800***		21.5	5.5
			5.2*		5.2*		5.2*		5.2*		5.2*		5.2*		5.2*	-*
06324925	Little Powder River** near Weston,Wy. (1 sample)	06/75	190***		110***		340***		453***		1,200***		2,090***		18.0***	
			2.1*		2.1*		2.1*		2.1*		2.1*		2.1*		2.1*	
06324970	Little Powder River** above Dry Creek near Weston, Wy. (53 samples)	06/75 to 06/77	320	46	180	23	590	100	633	112	2,100	340	3,440	621	27.0	.0
			1.4*	16*	1.4*	16*	.31*	16*	6.0*	16*	.02*	5.4*	.02*	5.4*	.00	.5-17*

TABLE RB-7
(cont'd)
CHEMICAL QUALITY DATA

Station Number	Station Name	Period of Record (month/year)	Dissolved Calcium (Ca) (mg/l) Max	Min	Dissolved Magnesium (Mg) (mg/l) Max	Min	Dissolved Sodium (Na) (mg/l) Max	Min	Dissolved Bicarbonate (HCO_3) (mg/l) Max	Min	Dissolved Sulfate (SO_4) (mg/l) Max	Min	Dissolved Solids (mg/l) Max	Min	Temperature (Degrees C.) Max	Min
06426500	Belle Fourche** River below Moorcroft, Wy. (sampled period-ically)	08/54 to 09/57											2,910	162		
													0.3*	132*		
		7-9/75	59	30	50	23	580	100	657	169	1,000	260	2,050	544	31	27
	(sampled monthly)		.05*	.10*	.10*	3.4*	.05*	3.4*	.05*	3.4*	.05*	3.4*	.05*	3.4*	.05*	.10

Source: Reports of the Geological Survey.

Note: Refer to Figure R2-16 for station locations.

* Streamflow discharge in cfs (cubic feet per second).
** Other analyses, trace metals, biological data, coliform, field tests of dissolved oxygen, and more are available in various reports of Geological Survey.
*** Only one value.

REGIONAL BIRD SPECIES LIST
SUMMER 1978

Birds not checked below are species potentially occurring in the region.

Observed	Censused	Common Name
X		Horned grebe
X		Eared grebe
X		Pied-billed grebe
X		Canada goose
X		Mallard
		Gadwall
X		Pintail
		American green-winged teal
X	X	Blue-winged teal
X		Cinnamon teal
X		American wigeon
X		Shoveler
		Redhead
		Canvasback
X		Lesser scaup
		Common goldeneye
		Barrow's goldeneye
		White-winged scoter
		Ruddy duck
		Common merganser
		Red-breasted merganser
		Hooded merganser
X		Goshawk
		Sharp-shinned hawk
		Cooper's hawk
X	X	Red-tailed hawk
		Harlan's hawk
X	X	Swainson's hawk
X	X	Rough-legged hawk
X	X	Ferruginous hawk
X	X	Golden eagle
		Bald eagle
X	X	Marsh hawk
X	X	Prairie falcon
		Peregrine falcon
X		Merlin
X	X	American kestrel
X	X	Turkey
X		Sharp-tailed grouse
X	X	Sage grouse
X	X	Ring-necked pheasant
X		Gray partridge
X		Great blue heron
		Snowy egret
		Least bittern

Observed	Censused	Common Name
		American bittern
X		White-faced ibis
X		Sandhill crane
		Virginia rail
X		American coot
X	X	Killdeer
		Mountain plover
X	X	Common snipe
		Long-billed curlew
X		Upland plover
		Spotted sandpiper
		Willet
X		Greater yellowlegs
X		Lesser yellowlegs
		Long-billed dowitcher
		Semipalmated sandpiper
		Western sandpiper
X		American avocet
X	X	Wilson's phalarope
		California gull
		Ring-billed gull
		Franklin's gull
		Black tern
X		Rock dove
X	X	Mourning dove
		Yellow-billed cuckoo
X	X	Black-billed cuckoo
		Barn owl
X	X	Great horned owl
		Screech owl
X		Burrowing owl
		Barred owl
		Long-eared owl
		Short-eared owl
		Saw-whet owl
		Poor-will
X	X	Common nighthawk
		White-throated swift
		Broad-tailed hummingbird
		Belted kingfisher
X	X	Common flicker
X	X	Red-headed woodpecker
		Lewis' woodpecker
		Yellow-bellied sapsucker
X		Hairy woodpecker
		Downy woodpecker
X	X	Eastern kingbird
X	X	Western kingbird
		Great crested flycatcher
		Eastern phoebe
X	X	Say's phoebe
		Willow flycatcher
		Northern flycatcher
X	X	Dusky flycatcher
X	X	Gray flycatcher
X	X	Western flycatcher

Observed	Censused	Common Name
X	X	Western wood peewee
X	X	Horned lark
		Tree swallow
		Bank swallow
		Rough-winged swallow
X	X	Barn swallow
X	X	Cliff swallow
		Purple martin
X		Blue jay
		Pinon jay
X	X	Black-billed magpie
X	X	Common crow
X	X	Black-capped chickadee
		Mountain chickadee
X	X	White-breasted nuthatch
		Red-breasted nuthatch
		Brown creeper
X	X	House wren
		Long-billed marsh wren
		Canyon wren
X	X	Rock wren
		Catbird
X	X	Brown thrasher
X		Sage thrasher
X	X	Robin
		Hermit thrush
		Swainson's thrush
		Veery
		Eastern bluebird
X	X	Mountain bluebird
		Golden-crowned kinglet
		Ruby-crowned kinglet
		Sprague's pipit
		Bohaemian waxwing
		Cedar waxwing
		Northern shrike
X	X	Loggerhead shrike
X		Starling
		Solitary vireo
X	X	Red-eyed vireo
		Warbling vireo
		Black-and-white warbler
		Orange-crowned warbler
X	X	Yellow warbler
		Magnolia warbler
X	X	Yellow-rumped warbler
		Chestnut-sided warbler
		Blackpoll warbler
		Ovenbird
		Northern waterthrush
		Yellowthroat
X	X	Yellow-breasted chat
		Wilson's warbler
		American redstart
X		House sparrow
		Bobolink

Observed	Censused	Common Name
X	X	Western meadowlark
		Yellow-headed blackbird
X	X	Red-winged blackbird
X	X	Brewer's blackbird
X	X	Common grackle
		Brown-headed cowbird
X		Northern oriole
X	X	Northern oriole
X	X	Western tanager
X	X	Black-headed grosbeak
		Evening grosbeak
X		Lazuli bunting
X	X	Cassin's finch
		House finch
		Pine grosbeak
		Pine siskin
X	X	American goldfinch
X	X	Red crossbill
		Rufous-sided towhee
		Savannah sparrow
		Grasshopper sparrow
X	X	Lark bunting
X	X	Vesper sparrow
X	X	Lark sparrow
X	X	Sage sparrow
X	X	Dark-eyed junco (slate-colored junco)
		Tree sparrow
X	X	Chipping sparrow
		Clay-colored sparrow
X	X	Brewer's sparrow
		Harris' sparrow
		White-crowned sparrow
		White-throated sparrow
		Fox sparrow
		Lincoln's sparrow
X	X	Song sparrow
X	X	McCown's longspur
X	X	Chestnut-collared longspur
		Lapland longspur

REGIONAL MAMMAL SPECIES LIST

Mammals not checked below are species potentially occurring in the region.

Observed	Caught or Censused	Common Name
		Opossum
		Masked shrew
		Vagrant shrew
		Merriam's shrew
X		Little brown myotis
		Long-eared myotis
		Long-legged myotis
		Silver-haired bat
		Horay bat
		Townsend's bat
		Big brown bat
X	X	Nuttall's cottontail
X	X	Desert cottontail
X	X	White-tailed jackrabbit
X	X	Black-tailed jackrabbit
X	X	Least chipmunk
X	X	Thirteen-lined ground squirrel
X	X	Black-tailed prairie dog
		White-tailed prairie dog
		Red squirrel
		Fox squirrel
		Northern pocket gopher
X		Plains pocket gopher
		Olive-backed pocket mouse
		Hispid pocket mouse
X		Ord's kangaroo rat
		Beaver
		Plains harvest mouse
		Western harvest mouse
X	X	Deer mouse
		White-footed mouse
X	X	Northern grasshopper mouse
		Bushy-tailed woodrat
		Gapper's red-backed vole
X	X	Meadow vole
		Mountain vole
		Long-tailed vole
X	X	Prairie vole
		Sagebrush vole
X		Muskrat
X		House mouse
		Norway rat
		Meadow jumping mouse
X		Porcupine

Observed	Caught or Censused	Common Name
X		Coyote
X		Red fox
		Swift fox
X		Raccoon
		Short-tailed weasel
X		Long-tailed weasel
		Mink
		Black-footed ferret
X		Badger
		Spotted skunk
X		Striped skunk
		Mountain lion
		Bobcat
		Elk
X	X	Mule deer
		White-tailed deer
X	X	Pronghorn antelope
		Bison

CULTURAL RESOURCES

Following is list of sites eligible or possibly eligible for listing on the National Register of Historic Places, according to the Wyoming State Historic Preservation Officer and the Bureau of Land Management.

CAMPBELL COUNTY

Astorian Route (Hunt Party)
Bozeman Trail
Chicago, Burlington and Quincy Railroad Route
Cook's 17 Mile Stage Station
Gillette
Keeline Ranch
Kendrick Ranch
Lx Bar Ranch
Mooney Site
Nixon Ranch
Norfolk Petroglyphs
Pumpkin Buttes
Ritchie Bro's Ranch
Standard Cattle Co.
Texas Trail Branch
Weare Ranch
Wyodak Coal Mine
101 Ranch
Site 48 CA 12
Site 48 CA 89
Site 48 CA 130
Site 48 CA 302
Site 48 CA 402
Site 48 CA 403

CONVERSE COUNTY

Ada Magill Grave
Andrews and Hudson Ranch
Antelope Creek Ranch Road
Antelope Creek Station
Antelope Springs
Astorian Route (Stuart Party)
Ayres Natural Bridge
Barber Home, Glenrock
Bed Tick Station
Big Muddy Oil Field
Big Nose George Cabin Site
Bill Hooker Cabin Site
Bonnevilles Route
Box Elder Station
Boyd Bro's Ranch
Bozeman Trail
Bridgers Ferry
Bronco Building, Glenrock
Brown's Spring
Brown's Spring Ranch Road

Brown's Spring Station
Buckshot or Cross Ranch
Burlington Northern Railroad Depot, Douglas
California Trail (misnamed)
Caryhurst Ranch
Cheyenne Fork Stage Station
Chicago and Northwestern Railroad Route
Chicago Burlington and Quincy Railroad Route
Converse County Courthouse
City Hall, Douglas
Christ Episcopal Church, Douglas
Converse County Courthouse, Douglas
Cross Ranch
Deer Creek Station
Douglas
Elkhorn Station
Fetterman Road
Filbertson Ranch
Fort Fetterman (listed on Register April 16, 1969)
Glenrock
Glenrock Buffalo Jump (listed on Register April 16, 1969)
Hanna and McCanley Ranch
Harris Ranch
Hayden Survey Site
"Hog" Ranch (near Fort Fetterman)
House, 425 Center St., Douglas, Wy.
House, 406 Cedar Street, Douglas, Wy.
United Church of Christ, 8th and Birch, Douglas, Wy.
House, 214 N. 6th Street, Douglas, Wy.
House, 107 N. 6th Street, Douglas, Wy.
House, 139 S. 7th Street, Douglas, Wy.
House, 309 N. 3rd Street, Douglas, Wy.
Kennedy, J.H. Ranch
Keyser Ranch
LaBonte (Bill Hooker Monument)
LaBonte Creek Station
LaPrele Creek Station
Little Box Elder Creek Monument
Mormon Town
Mormon Trail (misnamed)
Moses Ranch
Moss Agate Road Ranch
Oregon Trail
Overland Trail (first route)
Parkerton Station (Chicago and N.W.R.R.)
Perry, J.F. Ranch
Point of Rocks Road Ranch
Pony Express Route
Rice Ranch
Rock Creek - Fort
Sage Creek Fight Site
Sage Creek Road Ranch
Sage Creek Station
Sand Creek Road Ranch

Sand Creek Station
Sheriff's Office, Douglas
Smith Ranch
Spanish Diggings
St. James Catholic Church, Douglas
Teschemacker and DeBillier Ranch
Unthank Grave
Williams Ranch
Site 48 CO 26
Site 48 CO 43
Site 48 CO 52
Site 48 CO 305

VISUAL RESOURCES

Visual Resource Inventory and Evaluation Procedures

The evaluation process described below has been recently developed by the Bureau of Land Management (BLM). A complete explanation of the procedure with examples of various phases appears in BLM Manual 6300 entitled "Visual Resource Management"

The overall objective is to provide a Bureauwide systematic approach for identifying scenery quality and setting minimum quality standards for management of the visual resource values on public land. The process places all public land into one of five visual resource management classes. Each of these classes contains a specific management objective for maintaining or enhancing visual resource values. The visual management class assigned to a given land area depends upon three factors:

1. the inherent quality of the scenery being viewed
2. the visual sensitivity level (the type of visual use it receives)
3. the visual zone it is in

Scenic Quality

The process assigns a rating of: A—high scenic quality, B—moderate scenic quality, or C—low scenic quality to all lands within a given area, not just those administered by BLM. The procedure, as shown in Table RB-8, analyzes six key factors: landform, color, water, vegetation, uniqueness, and intrusions. Each of these factors is rated against a set of general criteria and a score assigned accordingly. When the evaluation is complete on a given land unit, the individual key factor scores are totaled and the letter rating A, B, or C is assigned, depending upon the total points received.

The scenery quality ratings for the Eastern Powder River Basin of Wyoming are described below.

Scenery Quality A: The only A quality scenery identified in the region is the North Platte River valley in Converse County. The river valley is a unique feature because it supports a relatively lush growth of grasses, shrubs, and cottonwoods in an area otherwise characterized by sparse vegetation. Also, the volume of stream flow is substantially greater than for any other stream in the region.

Scenery Quality B: There are B quality scenery areas scattered throughout the region, most of which are associated with either a ponderosa pine or juniper tree vegetative cover and/or a moderate topographic feature variety. Oil and gas development, utility lines, and roads are the main intrusions in this category.

Scenery Quality C: The region is predominately in the C rating category; the landforms, textures, and color are more muted than the areas in the B category. The characteristic landscape consists of open country with rolling plains, broad river courses, low hills, and scattered buttes. Water is rarely seen. There is no visually significant variation or contrast created by vegetation. The major intrusions are ranches with their related structures, highways and roads, transmission lines, water wells and reservoirs, oil and gas sites, coal mines and related structures, railroad lines, power plants, and farmland.

Visual Sensitivity Levels

Visual sensitivity level are determined by people's concern for what see. Criteria selected for analyzing sensitivity are: (1) use volumes of highway and transportation routes; (2) land use values (local and regional); (3) community attitude; and (4) other agency planning attitudes. These criteria and evaluation factors are listed in Table RB-9.

Use volume along Interstate 90 is estimated at 1,900 vehicles for average daily travel (ADT). Use of State Highway 59 between Gillette and the existing mining areas south of Gillette is estimated at 1,410 ADT. Use of State Highway 59 between the Campbell-Converse county line and Bill is estimated at 680 ADT. Use of State Highway 59 north of Gillette near Weston is estimated at 440 ADT. Use of U.S. Highway 14/16 northwest of Gillette is estimated at 530 ADT (Wyoming Highway Department 1976).

Land use values are considered to determine attitudes toward the use of land for mining versus historic uses of ranching and wildlife habitat. In Gillette and Douglas, the concern for such a change is rated low. Residents outside the immediate areas of Gillette and Douglas are more concerned about maintaining historic land uses with moderate economic growth, and preserving state water rights and wildlife habitat. They are expected to consider mining a moderate infringement upon other land use values.

Community attitude is based on concern for the "quality of life"that may exist in a booming mining community. Visual intrusions caused by mining may well cause concern about the appearance and planning of communities. Based upon the mix of residents (short-term and long-term), the matter is rated as being of moderate concern.

Agency planning attitudes are considered only for cities and counties, as state or federal lands are too small and scattered to reflect planning and development standards. In this category, local planning attitude for visual resources is considered moderate.

Overall the high sensitivity areas for managing visual resources lie within the heavily travelled zones along major highways and within the communities.

Visual Zones

Visual zones identify visible areas from key observation points (highways, well-traveled roads, overlooks, recreation sites) according to one of three types:

Foreground-Middleground: Foreground-middleground is described as the area visible from a travel route or observation point for a distance of 3 to 5 miles. The outer boundary of this zone is defined as the point where the texture and form of individual plants are no longer apparent in the landscape.

KEY FACTORS	RATING CRITERIA AND SCORE		
① LAND FORM	Vertical or near vertical cliffs, spires, highly eroded formations, massive rock outcrops, severe surface variation. 4	Steep canyon walls, mesas, interesting erosional patterns, variety in size and shape of land forms. 2	Rolling hills, foothills, flat valley bottoms. 1
② COLOR	Rich color combinations, variety or vivid contrasts in the color of soil, rock, vegetation, or water. 4	Some variety in colors and contrast of the soil, rock and vegetation, but not dominant. 2	Subtle color variation, little contrast, generally muted tones. Nothing really eye-catching. 1
③ WATER	Still, chance for reflections or cascading white water, a dominant factor in the landscape. 4	Moving and in view or still but not dominant. 2	Absent, or present but seldom seen. 1
④ VEGETATION	A harmonious variation in form, texture, pattern, and type. 4	Some variation in pattern and texture, but only one or two major types. 2	Little or no variation, contrast lacking. 1
⑤ UNIQUENESS	One of a kind or very rare within region. 6	Unusual but similar to others within the region. 2	Interesting in its setting, but fairly common within the region. 1
⑥ INTRUSIONS	Free from aesthetically undesirable or discordant sights and influences. 2	Scenic quality is somewhat depreciated by inharmonous intrusions but not so extensive that the scenic qualities are entirely negated. 1	Intrusions are so extensive that scenic qualities are for the most part nullified. -4
Scenery A = 15 - 24 Scenery B = 10 - 14 Scenery C = 1 - 9			

EXPLANATION OF RATING CRITERIA

① Land Form or topography becomes interesting as it gets steeper and more massive. Examples of outstanding land forms are found in the Grand Canyon, the Sawtooth Mountain Range in Idaho, the Wrangle Mountain Range in Alaska, and the Rocky Mountain National Park.

② Color Consider the overall color of the basic components of the landscape (i.e., soil, rocks, vegetation, etc.) as they appear during the high-use season. Key factors to consider in rating "color" are variety, contrast, and harmony.

③ Water is the ingredient which adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration in selecting the rating score.

④ Vegetation Give primary consideration to the variety of patterns, forms, and the texture created by the vegetation.

⑤ Uniqueness This factor provides an opportunity to give added importance to one or all of the scenic features that appear to be relatively unique within any one physiographic region. There may also be cases where a separate evaluation of each of the key factors does not give a true picture of the overall scenic quality of an area. Often it is a number of not so spectacular elements in the proper combination that produces the most pleasing scenery - the uniqueness factor can be used to recognize this type of area and give it the added emphasis it needs.

⑥ Intrusions Consider the impact of man-made improvements on the aesthetic quality. These intrusions can have a positive or negative aesthetic impact. Rate accordingly.

Table RB-8

SCENIC QUALITY RATING PROCEDURE

TABLE RB-9

CRITERIA FOR DETERMINING SENSITIVITY LEVEL

Criteria	High	Medium	Low
Use volume (Total use, no distinction between types)	More than 200 vehicles per day	20-200 vehicles per day	Less than 20 vehicles per day
Land use values			
Gillette and Douglas	Major	Secondary	Minor
Regional	Major	Secondary	Minor
Community attitude	Major	Secondary	Minor
Agency planning attitude	Major	Secondary	Minor

Background: Background is described as the area beyond the foreground-middleground, usually from a minimum of 3 to 5 miles to a maximum of about 15 miles from a travel route or use area. Atmospheric conditions in some areas may limit the maximum to about 8 miles or increase it beyond 15 miles.

Seldom Seen: All areas not identified in the two previous zones are considered to be in the seldom seen zone. Generally, these are areas seen from low use transportation routes or beyond the 15-mile background zone for other routes.

Visual Resource Management Classes

Following identification of the three evaluation factors, all areas of common characteristics are mapped and labeled.

Using the matrix shown in Table RB-10, one of five visual resource management classes is then assigned to each of the units with common characteristics. For example, all areas in Class B scenery, high sensitivity level, and the background visual zone would be in Visual Resource Management Class III.

Each class describes a different degree of modification allowed by a managing agency in the basic elements of the landscape.

Class I: This class provides for natural ecological changes only. It is applied to primitive areas, some natural areas, and similar situations where activities are to be restricted.

Class II: Changes in any of the basic elements (form, line, color, or texture) should not be evident in the characteristic landscape.

Class III: Changes in the basic elements (form, line, color, or texture) may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.

Class IV: Changes may subordinate the original composition and character, but must reflect what could be a natural occurrence within the characteristic landscape.

Class V: Intrusions overlying one of the management classes (I-IV) are significant enough to jeopardize effective management until the intrusions are removed.

Regional visual resource management classes are delineated on Map 9, Appendix A.

		2/ VISUAL SENSITIVITY LEVEL						
		HIGH			MEDIUM			LOW
SPECIAL AREAS		I	I	I	I	I	I	I
1/ SCENERY CLASS	A	II	II	II	II	II	II	II
	B	II	III	IV	III	IV	IV	IV
	C	III	IV	IV	IV	IV	IV	IV
		FG	BG	SS	FG	BG	SS	SS
		3/ VISUAL ZONES						

1/ SCENERY QUALITY INVENTORY (6310.11) — A, B, C

2/ VISUAL SENSITIVITY LEVEL (6310.12) — High, Medium, Low

3/ VISUAL ZONES (6310.13) — FG - Foreground - Middleground; BG - Background; SS - Seldom Seen

NOTE: Class I applies only to classified special areas, e.g., Wilderness, Primitive, Natural Areas, etc. This quality standard is established through legislation or policy.

Class V applies to areas identified in the scenery quality inventory where the quality class has been reduced because of unacceptable intrusions.

Table RB-10

VISUAL RESOURCE MANAGEMENT CLASS DETERMINATION

RECREATION RESOURCES

VISITOR USE STATISTICS

Bighorn National Forest	Increase (+) or Decrease (-) Over Previous Year
1972 - 1,135,800 Visitor Days	
1973 - 1,061,700	(-6.5%)
1974 - 981,000	(-7.6%)
1975 - 1,117,000	(+13.9%)
1976 - 1,244,500	(+11.4%)

Black Hills National Forest	
1970 - 1,765,000 Visitor Days	
1971 - 1,851,400	(+4.9%)
1972 - 1,632,000	(-11.9%)
1973 - 1,639,700	(+0.5%)
1974 - 1,501,300	(-8.4%)
1975 - 1,581,000	(+5.3%)
1976 - 2,306,500	(+45.9%)

Medicine Bow National Forest (Laramie Peak Ranger District)

1976 - 59,500 Visitor Days

1977 - Based on spring use, visitor use could reach 85,000+ visitor days.

Thunder Basin National Grasslands	1974 Recreation Use
Activity	Visitor Days
Auto Pleasure Driving	5,500
Motorcycle Driving	700
Horseback Riding	400
Snowcraft	1,200
Fishing	2,900
Camping	900
Picnicking	1,300
Hunting	12,000

The Forest Service estimates that visitation to the grasslands for 1976 is approximately the same as that reported for 1974. Forest Service statistics obtained by personal communication 1977.

Devils Tower National Monument	Increase (+) or Decrease (-) Over Previous Year
1970 - 147,444 Visitors	
1971 - 138,372	(-6.2%)
1972 - 149,306	(+7.9%)
1973 - 153,200	(+2.6%)
1974 - 125,592	(-18.0%)
1975 - 151,566	(+20.7%)
1976 - 169,754	(+12.0%)

Source: Personal communication, Wonder 1977

Wyoming State Parks Visitation

	Glendo	Guernsey	Keyhole
1975	117,449 Visitors	82,583 Visitors	65,908 Visitors
1976	117,881 (+.4%)	79,847 (-3.3%)	100,049 (+51.8%)

Source: Wyoming Recreation Commission 1976