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Appendix K:

Landtype Associations

Landtype Associations

Following are the landtype associations and ecological land units for the Black Hills. Landtype associations are combinations of the ecological land units. This information may be useful in project planning to identify areas with common resource potential and common responses to land management activities.

Ecological land units (ELUs) were originally identified in conjunction with the 1983 Forest Plan (Forest Service, 1980) using earlier reports and maps (Svatos, 1976). ELUs were identified by overlaying 14 geomorphic subunits with six vegetative units, resulting in 61 individual units. Additional information was developed on soils, water, and wildlife.

In 1988, the geomorphic subunits (expanded to 16) were redefined as landtype associations (Hoeft, 1988). Landtype associations range in size from about five square miles to several hundred square miles.

Landtype associations are a layer in the Forest Service's hierarchical framework of ecological units (Forest Service, 1994), as shown in Table 1.

Table 1. Black Hills As Identified in the Hierarchical Framework of Ecological Units

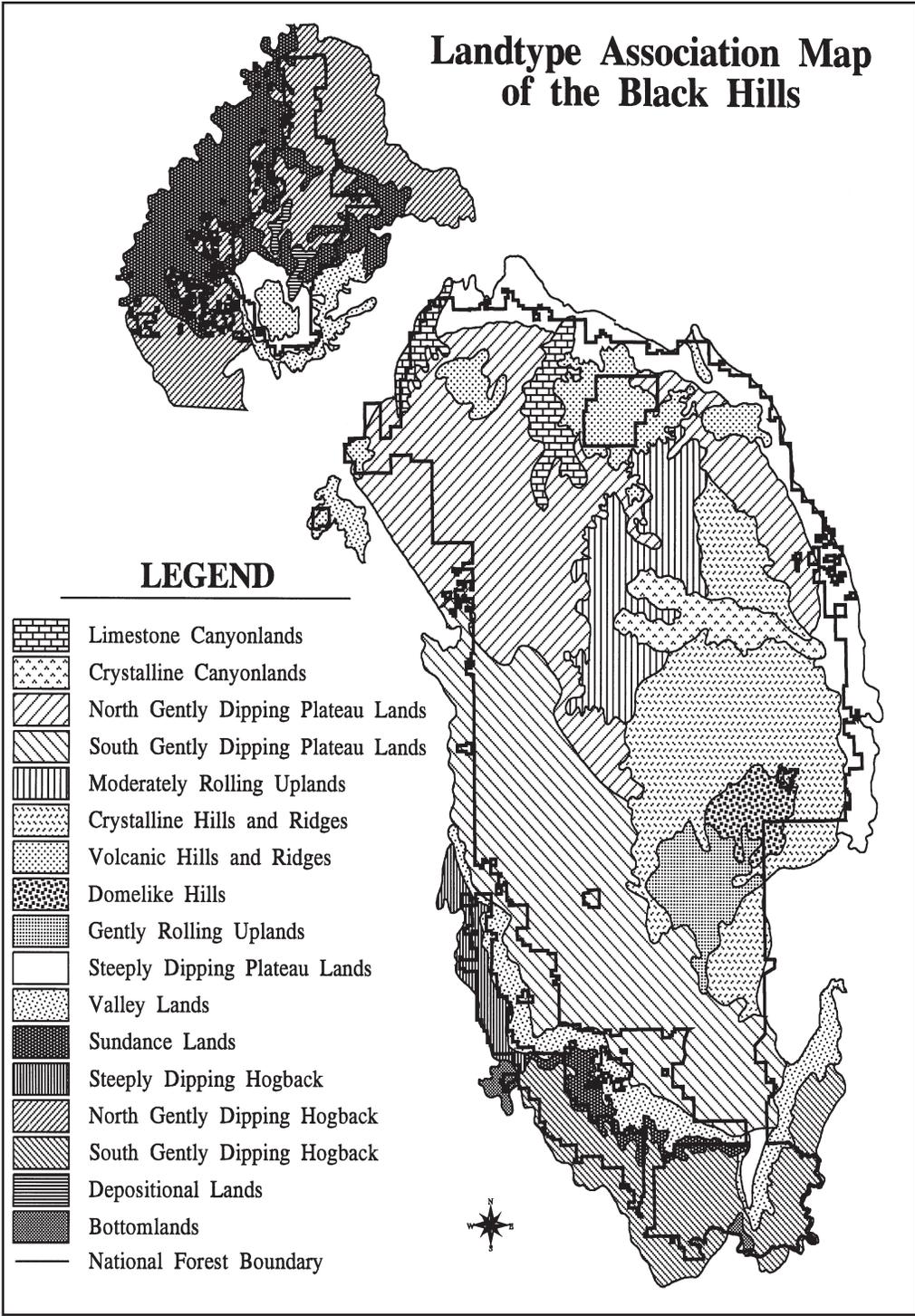
Domain	300 - Dry
Division	M330 - Temperate Steppe Regime, Mountains
Province	M334 - Black Hills Coniferous Forest Province
Section	M334A - Black Hills
Subsection	Subsections in the Black Hills have not been identified.
Landtype Associations	(As Shown in this Appendix)
Landtypes	Currently identified as the soil map units in NRCS soil survey reports.

Landtype Associations

Table 2 lists the landtype associations and associated ecological land units upon which they are based.

Table 2. Black Hills Landtype Associations and Ecological Land Units

LANDTYPE ASSOCIATION	ECOLOGICAL LAND UNIT
1. Limestone Canyonlands	ELUs 29 30 33
2. Crystalline Canyonlands	ELUs 9 10
3. North Gently Dipping Plateau Lands	ELUs 23 25 26 27 31 32
3. South Gently Dipping Plateau Lands	ELUs 21 22
4. Moderately Rolling Uplands	ELUs 8 13 14
5. Crystalline Hills and Ridgeland	ELUs 2 3 6 7 11 12
6. Volcanic Hills and Ridgeland	ELUs 15 60 61 62 63 64 65 66 67 68 69
7. Domelike Hills	ELU 1
8. Gently Rolling Uplands	ELU 5
9. Steeply Dipping Plateau Lands	ELU 20 24 28 35 36
10. Valley Lands	ELU 40 41 43 44 45 46
11. Sundance Lands	42 47 48
12. Steeply Dipping Hogback	ELU 52
13. North Steeply Dipping Hogback	ELU 53 54 55 56
14. South Gently Dipping Hogback	ELU 50 51
15. Depositional Lands	ELU 72 73
16. Bottomlands	ELU 70 71



Management Implications

LTA 1. Limestone Canyonlands

This landtype association has narrow ridges, very steep sideslopes, narrow valley bottoms and rock outcrops. Sideslopes generally are steeper than 40 percent. The valley bottoms generally are less than 300 feet in width. There is strong dissection.

Soils in the riparian zones are Maitland, Marshdale and Cordeston.

The very steep sideslopes have a high erosion potential when disturbed. Erosion control measures are needed to reduce erosion and stream sedimentation.

The very steep sideslopes also have a mass movement potential when disturbed. Management activities on very steep sideslopes near the riparian zones may cause mass movement and stream sedimentation.

In places, the vegetative buffer zones may be too narrow to filter sediment before it reaches the stream. These areas may need sediment barriers such as logs or straw bales.

Marshdale soils are subject to soil compaction and rutting from operation of heavy equipment. Restricting use of heavy equipment until soils are dry or frozen reduces compaction and rutting.

Concentrated livestock use will also compact Marshdale soils. Livestock use may need to be restricted when soils are wet.

LTA 2. Crystalline Canyonlands

This landtype association has narrow ridges, very steep sideslopes, narrow valleys and outcrops of slate and schist. Sideslopes generally are steeper than 40 percent. Rock outcrops comprise 30-45 percent of the unit. The valley bottoms generally are less than 300 feet in width. There is strong dissection.

Major soils in the riparian zones upstream from Pactola Reservoir are Marshbrook and Cordeston soils. Marshbrook soils are subject to soil compaction and rutting from operation of heavy equipment. Restricting use of heavy equipment until soils are dry or frozen reduces compaction and rutting.

Concentrated livestock use will also compact Marshdale soils. Livestock use may need to be restricted when soils are wet.

The very steep sideslopes have a high erosion potential when disturbed. Erosion control measures are needed to reduce erosion and stream sedimentation.

In places, the vegetative buffer zones may be too narrow to filter sediment before it reaches the stream. These areas may need sediment barriers such as logs or straw bales.

In some areas near riparian zones, the angle of the tilted bedrock is parallel to the soil surface. These areas may have a potential for mass movement when disturbed. This could result in some stream sedimentation.

LTA 3. Gently Dipping Plateau Lands.

This landtype association has broad and narrow ridges and valley bottoms, moderately sloping to steep sideslopes and rock outcrops. Sideslopes dominantly have slopes of 15-30 percent. Rock outcrops of sandstone and limestone comprise 10-15 percent of this unit. There is weak to strong dissection. The unit also includes Hell, Redbird and Gillette Canyons which have very steep sideslopes.

Soils in the riparian zones are Cordeston, Maitland, Marshbrook and Marshdale. The drier Cordeston and Maitland soils are dominant.

The Marshbrook and Marshdale soils are subject to soil compaction and rutting from operation of heavy equipment. Restricting use of heavy equipment until soils are dry or frozen reduces compaction and rutting.

Concentrated livestock use will also compact Marshbrook and Marshdale soils. Livestock use may need to be restricted when soils are wet.

In places, the vegetative buffer zones may be too narrow to filter sediment before it reaches the stream. These areas may need sediment barriers such as logs or straw bales. Generally, the narrow valley bottoms are more likely to have narrow buffer zones.

LTA 4. Moderately Rolling Uplands

This landtype association has broad ridges, moderately sloping to steep sideslopes, narrow to broad valley bottoms and rock outcrops. Sideslopes dominantly have 15-30 percent slopes. Valley bottom widths are variable; some are less than 300 feet. Rock outcrops of slate and schist comprise 10-20 percent of this unit. There is moderate dissection.

Major soils in the riparian zones are Cordeston, Maitland, Marshbrook and Marshdale. The Marshbrook and Marshdale soils are subject to soil compaction and rutting from operation of heavy equipment. Restricting use of heavy equipment until soils are dry or frozen reduces compaction and rutting.

Concentrated livestock use will also compact Marshbrook and Marshdale soils. Livestock use may need to be restricted when soils are wet.

Since this unit has some narrow valleys, the vegetative buffer zones may be too narrow in some places to filter sediment before it reaches the stream. These areas may need sediment barriers such as logs or straw bales.

This unit has a moderate erosion potential when disturbed.

LTA 5. Crystalline Hills and Ridgeland.

This landtype association has narrow ridges, moderately steep to steep sideslopes, narrow valley bottoms and rock outcrops. Most sideslopes range from 20-35 percent slope. Rock outcrops are mainly slate and schist with some granite outcrops. Rock outcrops comprise 15-25 percent of the unit. The valley bottoms generally are less than 300 feet in width. In some areas, valley bottoms are wider than 300 feet. There is strong dissection.

Major soils in the riparian zones are Cordeston, Maitland and Marshdale. The dominant Cordeston and Maitland soils do not have the compaction potential and high water tables of Marshdale and Marshbrook soils.

The Marshbrook and Marshdale soils are subject to soil compaction and rutting from operation of heavy equipment. Restricting use of heavy equipment until soils are dry or frozen reduces compaction and rutting.

Concentrated livestock use will also compact Marshbrook and Marshdale soils. Livestock use may need to be restricted when soils are wet.

In places, the vegetative buffer zones may be too narrow to filter sediment before it reaches the stream. These areas may need sediment barriers such as logs or straw bales. Generally, the narrow valley bottoms are more likely to have narrow buffer zones.

There is moderate to high erosion potential when disturbed.

LTA 6. Volcanic Hills and Ridgeland.

This landtype association has broad and narrow ridges, steep to very steep sideslopes, narrow valley bottoms and rock outcrops. Sideslopes dominantly are 30-45 percent slopes. Valley bottoms generally are less than 300 feet in width. Rock outcrops comprise 10 to 20 percent of this association. There is strong dissection.

Major soils in the riparian zones are Maitland and Marshdale. The dominant Maitland soils are drier than Marshdale soils.

Portions of this association are on very steep sideslopes which have a high erosion potential when disturbed. Erosion control measures are needed to reduce erosion and stream sedimentation.

The Marshbrook soils are subject to soil compaction and rutting from operation of heavy equipment. Restricting use of heavy equipment until soils are dry or frozen reduces compaction and rutting.

Concentrated livestock use will also compact Marshbrook soils. Livestock use may need to be restricted when soils are wet.

In places, the vegetative buffer zones may be too narrow to filter sediment before it reaches the stream. These areas may need sediment barriers such as logs or straw bales. Generally, the narrow valley bottoms are more likely to have narrow buffer zones.

LTA 7. Domelike Hills

This landtype association has narrow ridges, steep to very steep sideslopes, narrow valley bottoms and outcrops of granite. Sideslopes generally are steeper than 30 percent. Rock outcrops of granite comprise 25 to 40 percent of the unit. The valley bottoms generally are less than 300 feet in width. There is strong dissection.

Major soils in the riparian zones are Cordeston and Marshbrook. The dominant Cordeston soils do not have the compaction potential and high water tables of Marshbrook soils.

The Marshbrook soils have some management problems. They are subject to soil compaction and rutting from operation of heavy equipment. Restricting use of heavy equipment until soils are dry or frozen reduces compaction and rutting.

Concentrated livestock use will also compact Marshbrook soils. Livestock use may need to be restricted when soils are wet.

In places, the vegetative buffer zones may be too narrow to filter sediment before it reaches the stream. These areas may need sediment barriers such as logs or straw bales.

Portions of this landtype association are on very steep sideslopes which have a high erosion potential when disturbed. Erosion control measures are needed to reduce erosion and stream sedimentation.

LTA 8. Gently Rolling Uplands

This landtype association has broad ridgetops, gently to moderately sloping sideslopes, broad valley bottoms and rock outcrops. Sideslopes generally have slopes of 10-20 percent. The valley bottoms generally are more than 300 feet in width. Rock outcrops of slate, schist and granite comprise about 5-10 percent of the unit. There is moderate dissection.

Major soils in the riparian zones are Cordeston and Marshbrook. The dominant Cordeston soils do not have the compaction potential and high water tables of Marshbrook soils.

This unit has a low to moderate erosion potential from management activities.

The wider valley bottoms are more capable of filtering sediment compared to other units with narrow valley bottoms.

The Marshbrook soils have some management problems. They are subject to soil compaction and rutting from operation of heavy equipment. Restricting use of heavy equipment until soils are dry or frozen reduces compaction and rutting.

Concentrated livestock use will also compact Marshbrook soils. Livestock use may need to be restricted when soils are wet.

LTA 9. Steeply Dipping Plateau Lands

This landtype association has broad ridges, steep to very steep sideslopes, narrow valley bottoms and rock outcrops. Sideslopes dominantly have slopes of 30 to 50 percent. Rock outcrops of sandstone, limestone and some shale comprise 10 to 20 percent of the unit. The valley bottoms generally are less than 300 feet in width. There is strong dissection.

Major soils in the riparian zones are Cordeston and Winetti. These soils generally do not have high water tables.

Portions of this landtype association are on very steep sideslopes which have a high erosion potential when disturbed. Erosion control measures are needed to reduce erosion and stream sedimentation.

In places, the vegetative buffer zones may be too narrow to filter sediment before it reaches the stream. These areas may need sediment barriers such as logs or straw bales.

The wetter Marshbrook and Marshdale soils are subject to soil compaction and rutting from operation of heavy equipment. Restricting use of heavy equipment until soils are dry or frozen reduces compaction and rutting.

Concentrated livestock use on these wetter soils could compact them. Livestock use may need to be restricted when soils are wet.

There may be some landslides in this association. Management activities on steeper slopes near riparian zones may cause some mass movement and stream sedimentation.

LTA 10. Valley Lands

This landtype association has broad ridges, gently to moderately sloping sideslopes, broad valley bottoms and rock outcrops. Sideslopes dominantly have 5-20 percent slopes. Rock outcrops of reddish sandstone, shale and siltstone and gypsum comprise 10 to 20 percent of the unit. The valley bottoms generally are more than 300 feet wide. There is weak to moderate dissection.

Major soils in the riparian zones are Barnum and Haverson. Soils in the riparian zones are well drained. They generally do not have compaction problems or high water tables.

Soils on the ridges and sideslopes are quite silty and have a high erosion potential even though slopes are not steep. Severely-eroded areas and numerous gullies are common in this association. Gullies form easily where runoff concentrates on livestock and vehicle trails and road ditches.

LTA 11. Sundance Lands

This landtype association has broad ridges, moderately sloping to steep sideslopes, narrow valley bottoms and rock outcrops. Sideslopes dominantly have 20-35 percent slopes. Valley bottoms generally are less than 300 feet in width. Rock outcrops of shale, sandstone and limestone comprise 10 to 15 percent of this unit. There is moderate dissection.

Dominant soils in the riparian zones are Colombo and Lynx.

In places, the vegetative buffer zones may be too narrow to filter sediment before it reaches the stream. These areas may need sediment barriers such as logs or straw bales.

Although the wetter soils are minor, they are subject to compaction and rutting from operation of heavy equipment. Restricting use of heavy equipment until soils are dry or frozen reduces compaction and rutting.

Concentrated livestock use will also compact the wetter soils. Livestock use may need to be restricted when soils are wet.

There is moderate erosion potential when disturbed.

LTA 12. Steeply Dipping Hogback

This landtype association has broad ridges, moderately steep to very steep sideslopes, narrow valley bottoms and rock outcrops. Dominant slopes on the backslope are 20-30 percent. Dominant slopes on the front slope are steeper than 40 percent. The valley bottoms are less than 300 feet wide. Rock outcrops of sandstone, shale and limestone comprise 15-20 percent of this unit. There is strong dissection.

Soils in the riparian zones are Barnum and Winetti. They are well drained and generally do not have compaction problems or high water tables.

The very steep sideslopes have a high erosion potential when disturbed. Erosion control measures are needed to reduce erosion and stream sedimentation.

Some landslide areas are present on the very steep front slopes.

LTA 13. Gently Dipping Hogback

This landtype association has broad and narrow ridges, moderately steep to steep sideslopes, narrow valley bottoms and rock outcrops. Sideslopes dominantly have 20-35 percent sideslopes. Valley bottoms generally are less than 300 feet in width. Rock outcrops of shale, sandstone and limestone comprise 10 to 20 percent of this unit. Moderate dissection is dominant.

There are several soils associated with this association as it occurs around the Bearlodge Mountains and also the Hot Springs/Edgemont area. Soils of the riparian zones include Colombo, Cordeston, Haverson and Lynx. These soils generally do not have high water tables.

In places, the vegetative buffer zones may be too narrow to filter sediment before it reaches the stream. These areas may need sediment barriers such as logs or straw bales.

The steeper sideslopes have a high erosion potential when disturbed. Erosion control measures are needed to reduce erosion and stream sedimentation.

Although the wetter soils are minor, they are subject to compaction and rutting from operation of heavy equipment. Use of heavy equipment should be restricted until soils are dry or frozen to reduce compaction and rutting.

Concentrated livestock use will also compact the wetter soils. Livestock use may need to be restricted when soils are wet.

In the Bearlodge Mountains, this association contains some landslide areas. Management activities on steeper slopes near riparian zones may cause some mass movement and stream sedimentation.

LTA 14. Depositional Lands

This landtype association has broad ridgetops, gently to moderately sloping sideslopes, narrow valley bottoms and rock outcrops. Sideslopes dominantly have 10-20 percent slopes. Valley bottoms generally are less than 300 feet wide. Rock outcrops of clay, sandstone and limestone comprise 5-10 percent of this unit. There is weak dissection.

Major soils in the riparian zones are Cordeston and Lynx.

In places, the vegetative buffer zones may be too narrow to filter sediment before it reaches the stream. These areas may need sediment barriers such as logs or straw bales.

Although the wetter soils are minor, they are subject to compaction and rutting from operation of heavy equipment. Use of heavy equipment should be restricted until soils are dry or frozen to reduce compaction and rutting.

Concentrated livestock use will also compact the wetter soils. Livestock use may need to be restricted when soils are wet.

This association may contain some landslide areas on the steeper slopes. Management activities on the steeper slopes near riparian zones could cause some mass movement problems and stream sedimentation.

There is low to moderate erosion potential when disturbed.

LTA 15. Bottomlands

This landtype association has broad ridges, nearly level to moderately sloping sideslopes, broad valley bottoms and some rock outcrops. The sideslopes dominantly have 5-15 percent slopes. Valley bottoms generally are more than 300 feet in width. Rock outcrops of shale comprise 5-10 percent of the unit. There is weak dissection.

Dwyer, Glenberg and Haverson are the major soils of the riparian zones. They are well to excessively drained. They do not have season-long high water tables. Sometimes, the soils may be flooded for short periods.

There is low erosion potential when disturbed.

Literature Cited

Black Hills National Forest Ecological Land Units Study; USDA Forest Service; 1980.

Svatos, T. Ecological Land Units. Black Hills National Forest; March 4, 1976.

Ecological Subregions of the United States; Section Descriptions, WO-WSA-5; USDA Forest Service; July 1994.

Hoeft, D. Land Classification System and Soils Information; Black Hills National Forest; February 1988.