APPENDIX I
RELATIVE ROAD VALUE ANALYSIS

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Relative Road Value Analysis

Baseline road value information is important in transportation planning, as road management activities need to consider the current relative value of roads to the efficient management of the forest and to the public in general. The result of this analysis is a relative road value rating that approximates the value of roads for the seven different parameters studied. It could be expected that the value of these roads be high in general because of their cost to construct and their being designed and constructed for passage by low clearance vehicles

As one component of Steps 4 and 5 of the Road Analysis Process (RAP), information was collected and processed using Geographic Information System (GIS) computer technology. Only roads or portions of them, contained within the Forest boundary were evaluated and categorized. In this appendix, as throughout this document, numbers and mileages are based upon best available BHNF GIS data. Field verification of the data was not completed as part of this analysis.

The GIS analysis was evaluated for each Forest System Objective Maintenance level 3,4,and 5 road including those under county jurisdiction. All subsequent discussions under this roads analysis section refer to this selection of roads unless stated otherwise

In all cases, the individual value indicators are based on relative amounts of a parameter found on the Black Hills National Forest. The actual or 'absolute' value of roads relating to the selected parameters could not be determined within the scope of this analysis. An attempt was made to be conservative in assigning value conditions to increase the likelihood that high value areas would be identified. The assigning of these value conditions and the relative ranking of the results is based, in most cases, on the professional judgment of the specialists involved. It is important to note therefore that the relative value rankings should only be used as an indicator of the road's value and as a factor to balance against the relative risk estimate for the road when considering possible future management options.

In combining the individual value factors into the overall relative road value rating, the factors were weighted equally. It is likely that certain risks would contribute more or less to the overall risk of a particular road, area, or watershed but a valid method of weighting them could not be determined.

General relative value categories were assigned as follows:

0 – The road is of relatively low value.
1 – The road is of relatively moderate value.
2 – The road is of relatively high value.

Relative road value was evaluated using the following relative value indicators:

1. **Timber Access Value**
2. **Range Access Value**
3. **Firefighting Access Value**
4. **Fuels Treatment Value**
5. **Recreation Access Value**
6. **Transportation Value**
7. **Visual and Social Value.**

The individual value factors and the results of the analysis are presented below.

Timber Access Value

Access to suitable timber was chosen as a value parameter. The vegetation management of the forest requires efficient access by personnel and equipment to suitable timber over well spaced high and low clearance vehicles. The rating factor that was chosen is the number of acres of timber that is within 1.5 miles of a road. The level 3,4, and 5 roads have value because they pass through timber areas but they also have value when they get near timber where access can be gained using other high clearance roads. The distance of 1.5 miles was felt to be an appropriate average distance for access across a high clearance road. In many cases the actual distance could be much longer or shorter. The number of acres of suitable timber within 1.5 miles of each road was determined and relative values were assigned to each based on the following distribution.

0 - Relatively Lower Timber Access Value: 0 to 2,000 acres of suitable timber within 1.5 miles

1 - Relatively Moderate Timber Access Value: >2,000 to 5,000 acres of suitable timber within 1.5 miles

2 - Relatively Higher Timber Acess Value: >5,000 to 40,000 acres of suitable timber within 1.5 miles

Range Access Value

The Black Hills is divided into 133 areas known as range allotments. Many of these areas are leased to cattle ranchers for cattle grazing for a period of each year. The primary methods of access for transporting cattle to and from the range allotments are tractor trailer or a truck with a smaller livestock trailer. In both cases, the most efficient access is over level 3, 4, and 5 low clearance roads The rating factor that was chosen is the number of range allotments that a road passes through. The number of allotments was determined and relative values were assigned to each based on the following distribution.

0 - Relatively Lower Range Access Value: 0 to 2 range.

1 - Relatively Moderate Range Access Value: 3 to 4 range.

2 - Relatively Higher Range Acess Value: 5 to 10 range allotments

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Firefighting Access Value

Access to timber for wildland fire suppression activities is another important value for higher level roads. A key factor in preventing most fire starts from becoming escaped fires is getting appropriate resources to the fires quickly. The well developed matrix of higher speed roads throughout the Black Hills is a big factor in historically successful fire suppression activities. Another major value of roads is their use as a natural fire break. Level 3, 4, and 5 roads are an ideal anchor point for setting backfires in advance of the flame front of an escaped fire. Most of the large fires in the Forest are contained, at least in part by using roads as fire lines. RHV

To establish a firefighting access value, the Black Hills fire Risk, Hazard, Value (RHV) analysis layer was used. For the RHV analysis, the Forest was divided into a series of polygons. Each polygon was rated for the relative risk (low, moderate, and high) of fire starts, the hazard present once the fire starts, and the values at risk in the polygon. To estimate the firefighting access value, low, moderate and high ratings were assigned the numbers 0, 1, and 2 respectively and the numbers were totaled for each polygon. The resulting totals (RHV Rating) ranged from 1 through 6. The firefighting access value rating for each road was then calculated from the number of acres with a high RHV rating (4, 5, or 6) that are within 1.5 miles of a road. The distance of 1.5 miles was felt to be an appropriate average distance for quick access across a high clearance road from a level 3, 4, or 5 road. In many cases the actual distance could be much longer or shorter. The distribution of the acres within 1.5 miles of each level 3, 4, 5 roads was reviewed and the following ratings were assigned.

0 - Relatively Lower Firefighting Access Value: 0 to 1,500 acres with an RHV rating of 4,5,or 6 within 1.5 miles of the road.
1 - Relatively Moderate Firefighting Access Value: >1,500 to 5,000 acres with an RHV rating of 4,5,or 6 within 1.5 miles of the road.
2- Relatively Higher Firefighting Access Value: >5,000 to 40,000 acres with an RHV rating of 4,5,or 6 within 1.5 miles of the road.

Fuels Treatment Value

Access to the forest for the treatment of fuels is another very important road value. For the purposes of this analysis, the high priority fuels treatment areas were chosen to be areas in the Black Hills Fire Hazard Layer (2003 version) that were rated High Hazard in ponderosa pine, white spruce, aspen, birch, oak, and grass. These hazard ratings were previously determined using cover type, structural stage, elevation, slope, and aspect. Level 3, 4, and 5 roads have value because they pass through areas that are high priority for fuels treatment and they also have value when they get near these areas where access can be gained using other high clearance roads. As with suitable timber and firefighting access, the distance of 1.5 miles was felt to be an appropriate average distance for access across a high clearance road for fuels treatment personnel and equipment. The acres of high hazard areas within 1.5 miles of each road were determined and relative values were assigned to each based on the following distribution

0 - Relatively Lower Fuels Access Value: 0 to 1,000 acres of high hazard area within 1.5 miles of a road.

1 - Relatively Moderate Fuels Access Value: >1,000 to 3,000 acres of high hazard area within 1.5 miles of a road.

2 - Relatively Higher Fuels Acess Value: >3,000 to 21,000 acres of high hazard area within 1.5 miles of a road.

A current high priority for fuels treatment activities is also in the Wildland Urban Interface (WUI) areas. These are primarily areas of the forest around communities and private land inholdings in the Forest. It is felt that the access value for roads to these areas is captured in this factor and in Timber Access, Transportation, and Visuals and Social value ratings.

Recreation Access Value

Recreation activities in the Black Hills are plentiful and they occur, pretty much all year long in one form or another. Local communities rely heavily on income from tourism and recreation activities. Efficient access to dispersed and developed recreation areas is key to their level of use. Level 3, 4, and 5 roads have recreation value because they provide access to the forest for recreation to varying degrees. For this analysis, roads leading to a developed recreation site were given a value of 2. Roads leading to dispersed recreation areas were given a 1. Values of low recreation value were not assigned as the vast majority of the forest is open to at least dispersed recreation.

Transportation Value

A well developed system of level 3,4, and 5 roads is important to interforest transportation. These roads provide relatively efficient access across the Forest, between communities within the Forest, and to the many private land inholdings scattered throughout. They are woven into a grid of roads, including county, state, federal, and private roads, at all maintenance levels. The value of the Forest Service System Roads in this network is related to their traffic and maintenance level which is related to the road's Functional Class (Arterial, Collector, and Local). Arterial roads were assigned a relatively high value (2). Collector roads were assign a relatively moderate value (1), and Local roads were assigned a relatively low rating (0).

Visual and Social Value.

Much of the dispersed recreation and tourist traffic in the Forest is related to people driving through the Forest to enjoy the scenery. This traffic, in general, is concentrated on roads with high scenic integrity/value. The social value of a road for this analysis is related to the number of people that live along the road and use the road to commute daily to school, work, and other activities. The Forest Service has developed a Visuals Marking layer from its Scenic Integrity layer. It identifies roads that represent the value of these two factors. That layer was used to assign this relative value. Roads that were identified on the Visuals Marking layer as being significant were given a relatively high value rating (2). All other roads were given a relatively low rating (0).

Overall Relative Value.

The value rating for each of the above risk factors was added for each road with fourteen being the highest sum. The distribution of these sums was reviewed and an overall relative road value factor was assigned. The cumulative ratings are as follows:

0 - Relatively Lower Overall Road Value: 3 to 5 relative points

1 - Relatively Moderate Overall Road Value: 6 to 8 relative points

2 - Relatively High Overall Road Value: 9 to 14 relative points.

This overall value rating is used in section 5 of the main report, in conjunction with an overall risk rating to categorize each road and discuss opportunities and priorities.

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