
APPENDIX B

**SUMMARY OF HABITAT CONDITIONS ON THE
BLACK HILLS NATIONAL FOREST**

Appendix B – Summary of Habitat Conditions on the Black Hills National Forest

This appendix summarizes the habitat on the BHNF in the following sections:

- Evaluating Habitat Conditions
- Assessing Snags and Down Logs
- Assessing Riparian Areas
- Assessing Aquatic Habitats

Evaluating Habitat Condition

Evaluations of habitat conditions and trends on the BHNF for the purposes of assessing species viability were based, in part, on information found in the 1996, Revised Land and Resource Management Plan Final Environmental Impact Statement (FEIS) for Black Hills National Forest (1997). Table B-1 shows the number of acres by vegetation cover type and structural stage based on Table III – 15 from the FEIS. This data came from the Resource Information System (RIS) database for the Forest as of 1995. Percentages for a structural stage are based on the total acres of that cover type. Percentages in the total column are for each cover type based on 1,231,985 total vegetated acres.

Table B-1. Acres and percentages of habitat by cover type and structural stage in the BHNF based on the 1995 RIS database.

COVER TYPE	STRUCTURAL STAGE									
	1	2	3A	3B	3C	4A	4B	4C	5*	TOTAL
PONDEROSA PINE	23,502 2%	10,689 1%	97,511 9%	134,949 13%	46,767 4%	332,392 32%	258,784 25%	114,798 11%	22,409 2%	1,041,801 85%
WHITE SPRUCE	200 1%	27 <1%	972 4%	1,003 5%	183 <1%	11,920 55%	5,286 24%	1,585 7%	561 3%	21,737 2%
OTHER CONIFER	0	0	429 66%	111 17%	33 5%	17 3%	24 4%	33 5%	0	647 <1%
ASPEN/BIRCH	2,162 4%	2,903 6%	15,820 31%	13,702 27%	5,577 11%	6,030 12%	3,601 7%	673 1	380 <1%	50,848 4%
OAK	105	80	2,768	2,585	1,092	1,865	284	118	346	9,243 <1%
OTHER HARDWOODS	0	31 5%	410 64%	0	0	181 28%	4 <1%	12 2%	0	638 <1%
SHRUBS	0	2,897	0	0	0	0	0	0	0	2,897 <1%
GRASSES	104,174	0	0	0	0	0	0	0	0	104,174 8%
TOTAL VEGETATED	130,143 11%	16,627 1%	117,910 10%	152,350 12%	53,652 4%	352,405 29%	267,983 22%	117,219 10%	23,696 2%	1,231,985

*Structural stage 5 represents sites that have been inventoried and classified. See discussion in FEIS (pages III-139-143).

Information in the RIS database comes primarily from stand exams done for timber sale planning purposes. Such data is collected only on suitable timber sites. Information on unsuitable lands is derived from aerial photo interpretation.

There are some inherent inaccuracies with the 1995 RIS data. Timber sale planning is usually done in an area once every ten years. Stand exam data is collected immediately prior to the planning effort and is entered into the RIS database at that time. Once a timber sale is sold and

trees are removed, new data is not collected and the old data is not generally updated until the next planning cycle begins. Many sale areas contain pre-harvest data for recently harvested stands. Therefore the 1995 data may not give a true picture of forest conditions in 1995.

One way to get a more accurate picture of forest habitat conditions was to look at recent timber sale analyses. These documents use recently gathered stand exam data. This data is frequently ground-truthed and corrected by wildlife biologist and silviculturists, where necessary. While such information is not available for the entire forest, this approach gives a more precise, unbiased assessment of habitat conditions in these analysis areas. It also provides some information on the variability of habitat conditions across the forest by comparing habitat conditions among analysis areas. Habitat conditions from 37 project areas across the forest based on 37 project areas since 1993 is presented in Table B-2. Percentages for a structural stage are based on the total acres of that cover type. Total percentages are for each cover type based on total vegetated acres analyzed.

Table B-2. Acres and percentages of habitat by cover type and structural stage in the BHNF.

COVER TYPE	STRUCTURAL STAGE									TOTAL
	1	2	3A	3B	3C	4A	4B	4C	5*	
PONDEROSA PINE	13,745 3%	8,812 2%	23,634 6%	39,207 9%	25,441 6%	126,011 30%	139,249 33%	40,615 10%	8,945 2%	425,659 85%
WHITE SPRUCE	96 1%	84 1%	183 2%	299 3%	275 3%	3,005 34%	2,823 32%	1,575 18%	373 4%	8,713 2%
OTHER CONIFER	0	0	0	0	0	10	26	0	0	36 <1%
ASPEN/BIRCH	905 3%	3,084 12%	3,345 13%	7,321 28%	3,977 15%	3,192 12%	3,132 12%	1,468 6%	0	26,424 5%
OAK	30 0%	243 4%	881 15%	1627 27%	878 15%	960 16%	657 11%	575 10%	165 3%	6,016 1%
OTHER HARDWOODS	256 20%	244 19%	158 12%	136 11%	59 5%	111 9%	302 24%	0	0	1,266 <1%
SHRUBS	--	23 100%	--	--	--	--	--	--	--	23 <1%
GRASSES	33,483 100%	--	--	--	--	--	--	--	--	33,483 7%
TOTAL VEGETATED	33,360 7%	12,327 2%	28,111 6%	48,549 10%	30,609 6%	129,833 26%	143,791 29%	44,233 9%	9,483 2%	501,620

*Structural stage 5 represents sites that have been inventoried and classified. See discussion in FEIS (pages III-139-143).

The results of this analysis did not differ substantially from the 1995 RIS data shown in Table B-1 used for the revised Forest Plan. The forest is dominated by ponderosa pine (85%) of which a total of 63% is in structural stages (SS) 4A and 4B. SSs 1, 2 and 5 are most limited. Dense stands comprise 16% of pine, with dense pole stands (6%) more limited than dense mature stands (10%).

White spruce comprises only about 2% of the forest communities. SSs distribution is similar to pine with 66% in SSs 4A and 4B. Four percent is considered old growth (SS 5). Early seral stages of spruce (SS 1 and SS 2) are limited to about 2% of the community type. Dense stands comprise about 21% of spruce with dense pole stands (3%) much more limited than dense mature stands (18%).

Aspen and birch are present on about 5% of the forest. SSs are fairly evenly distributed compared to pine and spruce. SS 1 is limited to about 3% due in part to rapid regeneration

following clearcutting. The applicability of the term old growth to an early seral species such as aspen and birch is questionable, thus SS 5 has not been classified for aspen or birch.

Grasslands and meadows occur on about 7% of the forest. Bur oak, shrubs, other conifers and other hardwoods are all limited to less than 1% each on the forest. Shrub species include mountain mahogany, buffaloberry, serviceberry, snowberry, currant, and chokecherry. Other conifers include limber pine, lodgepole pine, Douglas fir, and Norway spruce. Other hardwoods include green ash, ironwood, hazelnut, river birch, bog birch, boxelder, cottonwoods, and willow.

While analysis of project areas did not provide significantly different data on existing conditions, it does provide a means of assessing recent habitat trend on the forest. Habitat trend from 1993 to 2000 was measured by the planned changes in community types and structural stages based on the preferred alternatives for the 37 project areas analyzed. Those changes are summarized in Table B-3. Percentages for a structural stage are based on the total acres of that cover type. Total percentages are for each cover type based on total vegetated acres analyzed.

Table B-3. Acres and percentages of habitat by cover type and structural stage in the BHNF

COVER TYPE	STRUCTURAL STAGE									TOTAL
	1	2	3A	3B	3C	4A	4B	4C	5*	
PONDEROSA PINE	17211 4%	19034 5%	30668 7%	37551 9%	23550 6%	139056 33%	110069 26%	35271 8%	8264 2%	420674 84%
WHITE SPRUCE	170 2%	85 1%	242 3%	242 3%	232 3%	2857 33%	2825 33%	1567 18%	373 4%	8593 2%
OTHER CONIFER	0	0	0	0	0	10	26	0	0	36 <1%
ASPEN/BIRCH	1563 5%	3905 14%	3692 13%	8099 28%	3875 14%	3306 12%	2805 10%	1448 5%	0	28693 6%
OAK	77 1%	293 5%	1148 18%	1625 26%	815 13%	1131 18%	580 9%	494 8%	165 3%	6328 1%
OTHER HARDWOODS	256 20%	252 19%	204 16%	141 11%	0	149 11%	288 22%	12 1%	0	1302 <1%
SHRUBS	--	6 100%	--	--	--	--	--	--	--	6 <1%
GRASSES	35763 100%	--	--	--	--	--	--	--	--	35763 7%
TOTAL VEGETATED	55040 11%	23575 5%	35954 7%	47658 10%	28472 6%	146509 29%	116593 23%	38792 8%	8802 2%	501,395

*Structural stage 5 represents sites that have been inventoried and classified. See discussion in FEIS (pages III-139-143).

During the analysis period, overall composition of community types on the forest has changed little with a slight reduction in pine (84%) and a slight increase in aspen/birch to 6%. This is likely due to current Forest Plan objectives to increase aspen/birch by 10%. This is usually accomplished by removing pine from mixed hardwood/conifer stands.

Commercial timber management activities in pine are currently decreasing SSs 4B and 4C and increasing SS 1, SS 2, and SS 4A. There have been reductions in the total acres of SS 3C and SS 5. Precommercial thinning is reducing SS 3B and increasing SS 3A.

Commercial treatments in spruce stands are having similar effects on structural stage distribution. Precommercial treatments are not generally conducted in spruce.

During the 7-year analysis period, approximately one-half of the forest was analyzed for timber management activities. Treatments generally occur on 30 to 65% of project areas. During the analysis period, trees in untreated sites are growing, becoming larger and denser.

In summary, community types that are limited on the forest are aspen, birch, spruce, oak, grasslands, and shrubs. Structural stage distribution in pine is skewed heavily to mature stands of open to moderate canopy closure. Limited structural stages include SS 1, SS 2, SS 3C, and SS 5. While SS 4C is not as limited as these other stages, it is still decreasing due to management activities.

Certain key habitat types and components are not included in this analysis. These include snags, down logs, riparian areas and aquatic habitats. A variety of methods were used to assess forest-wide conditions for these habitats.

Assessing Snags and Down Logs

Recent timber sale analyses also contain data on snag abundance. These analyses were reviewed and summarized. The Revised Forest Plan defined a snag as a dead tree greater than 10" dbh and greater than 15' tall. The objective for snag density is defined as an average of 1.08 snags per acre across a project area. A total of 40 project areas (approximately 544,000 acres) provided snag data based on these criteria. Average snag densities among project areas ranged from 0 snags/acre to 5.6 snags/acre. Mean snag density was 1.49 snags/acre.

Nineteen project areas (approximately 274,000 acres) averaged greater than 1.08 snags/acre while the other 21 areas (approximately 270,000 acres) did not meet the objective for snag density. Overall, snags appear to be limited with variable distribution. Fuelwood collecting and timber harvest reduce snag densities while natural processes such as insects, disease, fire, and windthrow create new snags. Timber harvest can also greatly affect the recruitment of future snags by removing all large diameter trees during overstory removal treatments. Timber sale plans have included live green replacement trees in overstory removal areas. The net effect of these processes on snag equilibrium is uncertain. Empirical trend information is lacking.

Timber sale analyses provide little information regarding down logs. Professional judgment was used to summarize abundance of down wood across the forest. In general, down wood appears to be adequate and meets the Forest Plan objectives of 50 linear feet per acre greater than 10-inch diameter. Large diameter down logs result from advance decay of dead trees and from windthrow. Large sound logs are susceptible to firewood collection. Smaller diameter down wood results from precommercial thinning and timber harvest residues. Overstory removals can also limit future levels of large down logs. Again, trend and equilibrium information is not available.

Assessing Riparian Areas

Riparian vegetation occurs on approximately 1 percent of the Black Hills including both private and public land (USDA - Forest Service 1997). Riparian areas on the forest vary considerably in terms of structure and diversity, ranging from sedge/grass/forb communities to shrub/deciduous/tree communities. Historical literature and photographs indicate that riparian areas previously included an extensive woody shrub component and a wet meadow component. These natural riparian components have been substantially reduced. Many drier-site species

dominate drainages today. Changes have resulted from a number of influences during the last century including mining, grazing by livestock, removal of beaver, fire suppression, agricultural clearing, road construction, and draining of wetlands for commercial and recreational development. Today the greatest impacts on riparian vegetation on public lands result from livestock grazing, road construction, and fire suppression. Efforts have been made in the last decade to reduce siltation from roads, control or exclude livestock grazing, and re-establish woody shrubs through planting. The problems in riparian areas are extensive and will take much time and effort to reverse. However, the trend is now improving and should continue to improve over the next decade.

Assessing Aquatic Habitats

Recent condition and trend of aquatic habitats is discussed in the FEIS for the Revised Forest Plan. In general water quality in the Black Hills is “good to satisfactory” based on the South Dakota Department of Environment and Natural Resources 305(b) Water Quality Assessment (1994). They reported few localized water quality problems in Black Hills streams ranging from minor to severe. From a biological standpoint, minor water quality impairments such as pH, temperature, total suspended solids, conductivity or pathogens may alter aquatic communities. Acid drainage from mine tailings has caused the most severe impacts in some northern Hills streams. Loss of riparian shrubs has increased water temperatures. Streams throughout the Black Hills are impacted by livestock use, road construction, and past mining activities. In particular fisheries in Sand Creek are threatened due to both sediment and pathogens. Implementation of Best Management Practices for both mining and forestry, as well as, use of riparian enclosures and rotation grazing systems should improve water quality.

In addition to water quality, fish habitat has been altered by introduction of non-native fish species by both State agencies and fishing enthusiasts. Historically fish species were limited to five species of minnows. Today these species must compete with about 20 introduced species many of which are predaceous. However, all of the native species are still found in the Black Hills.