

Process for Identifying Wildlife and Plant Species of Local Concern and Results

Black Hills National Forest Phase II Plan Amendment

Prepared for:
United States Department of Agriculture-Forest Service
Black Hills National Forest



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1. OBJECTIVE OF THE PROCESS

The objective of this process is to identify terrestrial and aquatic plant and animal species for which there is a local conservation concern over the next planning period on the Black Hills National Forest (BHNF). These species will be the subject of more intensive review during the BHNF Land and Resource Management Plan (Forest Plan) Phase II Amendment process.

Implementation of the identification process and the subsequent assessments and conservation strategies represents a management strategy intended to promote species conservation on the BHNF as required by National Forest Management Act (NFMA), as well as, prevent listing of species under the Endangered Species Act (ESA). It was designed to incorporate the best science and data available into a qualitative model for each species. The process and supporting documentation will facilitate future reviews of the determinations based on new information. This is a proactive approach that recognizes the importance of preventing species declines and/or local extirpations as a practical measure of successful ecosystem management.

1-1. BACKGROUND

A process was needed to determine what species were of local concern in meeting the NFMA diversity and conservation requirements on the BHNF based on the October 12, 1999 appeal decision for the Revised Forest Plan, which states that “enough deficiencies were noted to warrant re-evaluating the sufficiency of the Revised Plan in relation to diversity and viability.” The United States Department of Agriculture, Forest Service (USDA-Forest Service) is directed by 36 Code of Federal Regulations (CFR) 219.19 to provide wildlife habitats capable of supporting viable populations of native and desired non-native species. An effort is underway in the Rocky Mountain Region (R-2) to modify the R-2 Sensitive Species list. However, the focus of the NFMA planning regulations is on a forest, not the region. To facilitate management of

native and desirable non-native plant and animal species the USDA-Forest Service developed a list of species of local concern separate from the Regional Sensitive Species list.

This document presents the process for identifying these species on the BHNF in the following sections:

2. About the Process
3. The Process
4. Results and Recommendations
5. References

2. ABOUT THE PROCESS

An effort to develop a comprehensive list of species of local concern was initiated early in the Forest Plan amendment process. The Forest reviewed native and desired non-native species that occur or are likely to occur in the Black Hills Ecoregion (Black Hills) that were not listed as a Region 2 Sensitive Species and were not listed as Threatened, Endangered or Proposed under the Endangered Species Act (ESA). The Region 2 Planning Desk Guide (USDA-Forest Service 2003) defines species of local concern as “species that are documented or suspected to be at risk at a local scale within Region 2, but do not meet the criteria for regional Sensitive Species designation”. Likewise, species listed as Threatened, Endangered or Proposed under the ESA were not evaluated because they will already be analyzed due to their listing status.

Species were classified based on occurrence, habitat, population size and trend, and vulnerability to management activities. Whether a species had been identified as a species of concern by other agencies was also considered. Each species was assigned to one of three categories:

- Species of Local Concern
- Species Not of Local Concern
- Insufficient Information Available

The process used to identify species of local concern was adapted from the process developed and used in the Chugach National Forest (Suring and Murphy 1998), and the R-2 process to identify emphasis species, including species of local concern. The process also incorporated efforts of other agencies such as Partners in Flight (PIF), The Nature Conservancy, and International Union for the Conservation of Nature (IUCN) that rank species for conservation based on risk criteria. The process began with lists of species occurring on the BHNF built from local references. For vertebrates, only species that are year-round or seasonal residents of the Black Hills were analyzed. For plants and invertebrates, species that were listed with at least one agency as having a concern for conservation were analyzed. Lists reviewed for this process included species:

- Tracked by South Dakota or Wyoming Natural Heritage programs as S1 or S2, or otherwise of special concern.
- Listed as threatened or endangered by South Dakota or Wyoming,
- Listed on the IUCN red list.

This process reduced the need for further analysis and documentation of very common and/or naturalized species. Other species may also be analyzed in the future depending on time and funding and as new information becomes available.

USDA-Forest Service biologists and botanists applied this process to 490 species and documented the basis for classification for each species (Allen et al. 2002). During 2002, as the USDA-Forest Service's contractor for the Phase II amendment, SAIC reevaluated the initial classification of 490 species and additional species to produce a draft species of local concern list. Forest Service personnel reviewed and provided comments on the draft list of species of local concern. Based on the comments and additional sources of information, SAIC then prepared the final list of species of local concern.

3. THE PROCESS

The process consists of the following elements:

- Assign Rankings
- Integrate the Rankings into Determinations
- Results and Recommendations

Information supporting this process is presented in the following appendices:

Appendix A	List of Species of Local Concern and Species with Insufficient Information Available to Make a Determination
Appendix B	Summary of Habitat Conditions on the Black Hills National Forest
Appendix C	Sample Species Ranking Sheet
Appendix D	Plants Summary Table and Species Ranking Sheets
Appendix E	Invertebrates Summary Tables and Species Ranking Sheets
Appendix F	Fish Summary Table and Species Ranking Sheets
Appendix G	Amphibians and Reptiles Summary Table and Species Ranking Sheets
Appendix H	Birds Summary Table and Species Ranking Sheets
Appendix I	Mammals Summary Tables and Species Ranking Sheets

3-1. ASSIGN RANKINGS

Eight criteria were used to rank aspects of vulnerability for vertebrates, invertebrates and plant species in the Black Hills. Except for criterion 1, these eight criteria are the same for vertebrates, plants, and invertebrates:

- 1) Seasonal occurrence in the Black Hills (for vertebrates); included on at least one agency list (for plants and invertebrates)
- 2) Geographic distribution within the Black Hills
- 3) Geographic distribution outside the Black Hills
- 4) Abundance of the species in the Black Hills
- 5) Population trend in the Black Hills
- 6) Vulnerability of habitats in the Black Hills to modification as a result of land management activities currently implemented or proposed for implementation

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- 7) Capability of the species to disperse
 - 8) Life history and demographic characteristics of the species

An alpha rank of concern was assigned to each criterion for each species as follows:

- A = High concern
- B = Some concern
- C = No concern
- D = Insufficient information to assign a rank

These rankings were based on the biological understanding of the species available in the published literature and the best local survey and monitoring data. Sources for such data include USDA-Forest Service records; State Natural Heritage Programs databases; South Dakota Department of Game, Fish, and Park censuses; Wyoming Department of Game and Fish censuses; breeding bird surveys; local university research; and professional experience. A ranking of “D” was assigned to those situations when available information was not adequate to assign ranking. When a species' rank for a criterion was not clear-cut two letters were assigned to describe the rank. For example if a particular species was rare in the Black Hills of Wyoming and its abundance and occurrence in South Dakota was not known, it received an AD rating. This is similar to what the R-2 USDA-Forest Service does in its sensitive species evaluation process.

3-2. EVALUATING SPECIES

Criteria and associated alpha ranks of concern are described below for vertebrates, non-vertebrates, and plants. As discussed above, criteria 1 differ for vertebrates and plants and invertebrates.

3-2.1. Vertebrates

The following criterion and associated alpha rankings of concern were used for vertebrates.

Step 1. Apply Criterion 1 – Seasonal occurrence in the Black Hills. Species status was determined from published accounts of species distribution and natural history. Only species that were year-round or seasonal residents were analyzed further. Potential effects of land management practices will be much greater on those species that breed in the Black Hills or are year-round residents. The determination of species status provides the rationale for which species were analyzed further in this process. This criterion was adopted from the Chugach National Forest’s process for evaluating the risk to viability of wildlife species (Suring and Murphy 1998).

The alpha rankings of concern for this criterion follow:

- B = Year-round or seasonal resident
- C = Migrant, occasional

3-2.2. Plants and Invertebrates

The following criterion and associated alpha rankings of concern were used for plants and invertebrates.

Step 1. Apply Criterion 1 – Included on at least one agency list. This criterion functioned as the initial screen for further analysis. Employing lists compiled by other agencies substantially reduced the workload and eliminated such species as exotics, weeds, and naturalized non-natives. To pass this initial screen, species must be included on one or more of the following:

- 1) Ranked S1 or S2 by South Dakota Natural Heritage database or Wyoming Natural Diversity database, or otherwise identified as special concern by Natural Heritage Programs
- 2) State threatened and endangered
- 3) IUCN Red list

Species listed by more than one agency or organization likely have greater concerns than those listed only once. The Northern Great Plains Science Team, in evaluating population viability, used a similar screening process for the Northern Great Plains Assessment (USDA - Forest Service, draft).

The alpha rankings of concern for this criterion follow:

- A = Two or more listings
- B = One listing
- C = No listing

Note: Species screened by David J. Ode of South Dakota Department of Game, Fish and Parks may have additional rankings in Criterion 1. Endemic species are denoted by E and historical species are denoted by H in addition to A, B or C in Criterion 1.

3-2.3. Vertebrates, Plants, and Invertebrates

The following criteria and alpha rankings were used for vertebrates, plants, and invertebrates.

Step 2. Apply Criterion 2 – Geographic distribution within the Black Hills. Species that are present in few locations within the Black Hills have a higher risk of extirpation. Interchange of individuals between subpopulations is limited and subpopulations are more vulnerable to local events such as disease, storms, catastrophic fires, and weed infestations that may cause extinction. Certain habitats are naturally limited in the Black Hills including hardwoods, spruce, riparian, and oak. Species associated with these habitat types may be more susceptible to conservation concerns. Local and regional accounts of species distributions and general habitat associations were used to evaluate geographic distribution. This criterion was adapted from the Chugach National Forest process and is similar to criteria used by The Nature Conservancy, IUCN, and PIF.

The alpha rankings of concern for this criterion follow:

- A = A few locations
- B = Several locations

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- C = Throughout the Forest
 - D = Unknown

Step 3. Apply Criterion 3 – Geographic distribution outside of the Black Hills. A species' distribution outside the Black Hills can affect its conservation within the Black Hills. Low recruitment from outside populations can limit recolonization of suitable habitat and lower genetic diversity. Species (or subspecies) that are currently known to only occur in the Black Hills would receive a high level of concern. Potential for recolonization and maintenance of genetic diversity in this situation can be very limited. A species (or subspecies) that is mostly restricted to the Black Hills with a currently known limited distribution outside of the Black Hills would have a moderate level of concern. The risk of extinction associated with activities in the Black Hills can be moderated by the potential for recolonization from populations existing elsewhere. A species with wide distribution outside the Black Hills would generally have a low risk as a result of activities on the Black Hills and would receive a ranking of no concern. Species and subspecies distribution outside the Black Hills was evaluated from range maps published for each species, generally from accounts of the species' natural history. This criterion was adopted from the Chugach National Forest process and is similar to criteria used by The Nature Conservancy, IUCN, and PIF.

The alpha rankings of concern for this criterion follow:

- A = Only in the Black Hills
- B = Limited distribution outside the Black Hills
- C = Wide distribution outside the Black Hills
- D = Unknown

Step 4. Apply Criterion 4 – Abundance of the species in the Black Hills. Population density or abundance is a primary factor in determining whether a species will persist following habitat loss (Lehmkuhl and Ruggiero 1991). All things being equal, the lower the abundance or density, the greater the risk of extinction (Pimm et al. 1988, Terborgh and Winter 1980). Rankings were based on categorical estimates of abundance relative to the expected abundance of that species in good habitat. This approach avoids problems associated with using actual population or abundance estimates for widely diverse species. For example, 100 grizzly bears may be a large population but 100 limber pine trees may be very small. Estimates of population abundance were taken from inventory and monitoring reports, breeding bird survey data, state agency population estimates, and published qualitative population estimates. This criterion was adapted from the Chugach NF and is similar to criteria used by The Nature Conservancy, IUCN, and PIF.

The alpha rankings of concern for this criterion follow:

- A = Rare
- B = Uncommon
- C = Common
- D = Unknown

If a species was considered rare to locally common then a "B" was assigned.

Step 5. Apply Criterion 5 – Population trend in the Black Hills. Another primary factor indicating that a species may be at risk is a persistent downward trend in population size. Declining populations are an indication of concern even if current population size is large. Of particular concern for assessing conservation with regards to NFMA requirements was population trend on the Black Hills. If a species population trend was unknown, trends in quantity and/or quality of the species' habitat were considered to be indicative of a population trend. Results of local and national monitoring programs were used to assign values for this criterion. Habitat trend was determined from the BHNF database summarized in Appendix B or from the collective experience of the team of biologists and botanists conducting the evaluation. Population and/or habitat trends of $\pm <5\%$ were considered to be stable. Population trend estimates with very high variances or based on very small sample sizes were not used. Breeding bird survey data used to determine population trends were evaluated carefully considering the statistical deficiencies of this data (Sauer et al. 2001). This criterion was adapted from the Chugach National Forest process and is similar to criteria used by The Nature Conservancy, IUCN, and PIF.

The alpha rankings of concern for this criterion follow:

- A = Downward or suspected downward (habitat considered if population trend unknown)
- B = Stable
- C = Upward
- D = Unknown

Step 6. Apply Criterion 6 – Vulnerability of habitats in the Black Hills to modification as a result of land management activities currently implemented or proposed for implementation. The primary causes of habitat modification in the Black Hills have been urban and rural development, timber harvest, livestock grazing, mining, fire suppression, catastrophic fire, and road construction. Human developments, recreation and livestock use tend to be concentrated in areas with high habitat values, primarily riparian areas, hardwood stands, and meadows. Fire suppression and timber harvest have altered natural succession. The effects of these activities are habitat loss, degradation, and fragmentation, which reduce the availability and suitability of original habitats (Lehmkuhl and Ruggiero 1991). This criterion evaluated the potential effects of habitat modification on species. Information for this criterion came from accounts of species' habitat use patterns or occurrences and information on habitat trends from the BHNF database. When data were not available on specific habitat features, the analysis relied on the collective professional expertise of the biologists and botanists conducting the evaluation. This criterion was adapted from the Chugach National Forest process and is similar to criteria used by The Nature Conservancy and PIF.

The alpha rankings of concern for this criterion follow:

- A = Habitat very limited and/or very vulnerable
- B = Habitat somewhat limited and/or somewhat vulnerable
- C = Habitat widely available and/or resilient
- D = Unknown

Step 7. Apply Criterion 7 – Capability of the species to disperse. Dispersal of individuals, seeds, pollen, or spores from a population may be limited because a species has low vagility or because barriers to dispersal exist. Barriers can occur naturally or may be induced through management practices resulting in areas unsuitable as habitat between residual tracts of preferred habitat. Given that the Black Hills is an island of forested habitat surrounded by vast areas of grasslands increases the importance of dispersal capabilities. Species, which do not disperse readily across large areas of unsuitable habitat, are at greater risk for extinction in the Black Hills. Additionally, within the Black Hills certain habitat types are naturally fragmented such as aquatic, riparian, hardwoods, and spruce. Conservation of species associated with these habitat types may be limited by their dispersal capabilities. Additionally, barriers such as culverts, impoundments, or discontinuous stream networks may limit aquatic species. The ability of plant species to disperse can depend on seed, pollen, or spore dispersal agents and reproductive strategy. Species that are mobile and for which dispersal is not limited by unsuitable habitats were assigned a value of no concern. Species that can disperse but only within suitable habitat were assigned a moderate level of concern. Species for which dispersal is limited by behavioral patterns or physical capability were assigned a high level of concern. Species determined to be “good dispersers”, but for which nearby habitat was unavailable were still ranked as “good dispersers”. This criterion was adapted from the Chugach National Forest process.

The alpha rankings of concern for this criterion follow:

- A = Very limited dispersal ability
- B = Disperses only through suitable habitat (dispersal areas may or may not be corridors)
- C = Readily disperses across landscapes
- D = Unknown

Step 8. Apply Criterion 8 – Life history and demographic characteristics of the species.

Life history factors, such as reproductive rate, susceptibility to disease, predation, or competition, can affect population size and ability to rebound from stochastic or anthropogenic population reductions. Factors that affect reproductive rates in vertebrates include number of reproductive cycles/year, average number of young produced/breeding cycle, and minimum age of first reproduction in females (Henny et al. 1970). Life history factors in plants include seed, pollen and spore dispersal strategy, pollination agents, and susceptibility to herbivory. Variation in vital rates can also be important (Goodman 1987). Species with low reproductive rates and which are highly susceptible to disease, predation or competition may have less ability to recover from population declines. Those species were assigned a high level of concern. Species with high reproductive rates and which are not particularly affected by predators, disease agents, or competitors have a greater ability to recover. These species were assigned a level of no concern. Species that have either a low reproductive rate or some susceptibility to disease, predation, or competition were assigned a moderate concern level. Compared to animal species, less data was available for plant species and therefore most plant species were ranked unknown for this criterion. This criterion was adapted from the Chugach National Forest process and is similar to criteria used by The Nature Conservancy and IUCN.

The alpha rankings of concern for this criterion follow:

- A = Low reproductive rate **and** highly susceptible to disease, predation, or competition

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- B = Low reproductive rate **or** susceptibility to disease, predation, or competition
 - C = High reproductive rate **and** not susceptible to disease, predation, or competition
 - D = Unknown

3-3. INTEGRATE THE RANKINGS INTO DETERMINATIONS

The level of concern ranks for each criterion were reviewed for each species. Rationale for each species determination was documented on a species Ranking Sheet (see attached Appendix C). Any species that received an “A” rank for one or more criteria received further review. A final determination of a concern was based upon a review and discussion of all the criteria. The process identified two levels of concern: 1) local concern or 2) insufficient information.

Determination of a local concern was based on all criteria but relied most heavily on the following:

- Decline in population trend of >5%, **and/or**
- Very restricted and vulnerable habitat, **and/or**
- Very small population size

Species whose ratings included a “D” were reviewed further. The relative importance of the specific criterion receiving a “D” rank was evaluated in the overall concern determination. When possible, a determination was made without the information from that criterion. If insufficient information was available to make a determination, the species was categorized as “Insufficient Information Available.”

4. RESULTS AND RECOMMENDATIONS

The process described in this paper was applied by the USDA-Forest Service during 2000 on 490 species, including 258 bird species, 79 mammal species, 21 species of reptiles and amphibians, and 44 species of fish were evaluated. Additionally, 2 butterflies, 4 land snails, and 82 plant species were evaluated by the USDA-Forest Service after they passed through Step 1.

During 2002, SAIC reevaluated each of the 490 species based on new Species Assessments, recent surveys conducted in the BHNF, and other updated information. In addition to reevaluating these species, SAIC evaluated new species that had not been reviewed in 2000, either because their status on BHNF had changed, they had not been previously documented on BHNF, or they appeared on agency lists for the first time. In Step 1 SAIC examined a total of 1,927 species, comprising: 245 birds, 71 mammals, 20 reptiles and amphibians, 44 fish, 22 butterflies, 33 snails, two beetles, and 1490 plants. Three hundred sixty species passed the screening process in Step 1 and were evaluated in further detail for the seven remaining criteria. These species included 126 birds, 57 mammals, 17 amphibians and reptiles, 36 fish, 8 invertebrates, and 116 plants.

The screening process conducted by the USDA-Forest Service was performed by a team of 4 USDA-Forest Service biologists with a total of 46 years of experience working on the BHNF. Completing the screening process required about six weeks. The additional screening conducted by SAIC was performed by a team of 10 biologists with over 100 years of combined biological

experience. The names of the reviewers are listed on the species ranking sheets in Appendices D-I.

Based on the evaluations by the USDA-Forest Service and SAIC, a total of 33 species are recommended as species of local concern. These species are listed in Appendix A. There was insufficient information available to make a determination on 74 species (Appendix A). For species listed as "Insufficient Information Available," a list of information needs was included on each species' ranking sheet. This information should be gathered until a determination of local concern or no concern can be made.

5. REFERENCES

This section contains references used to prepare this document, as well as references used to identify and rank species of local concern. Full citations for some references are not provided. Specifically, dates for websites viewed by USDA-Forest Service personnel are not provided; it is assumed these websites were viewed during 2000.

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