

BIGHORN NATIONAL FOREST

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Revised Land and Resource Management Plan

*Errata 06-14-2007*

# Emphasis Species



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## Selected Emphasis Species

This appendix displays the emphasis species selected on the Bighorn National Forest. Emphasis species were selected as a surrogate for addressing the viability of all species that may inhabit the Forest. The use of such categories has been encouraged at the national and regional offices of the Forest Service (Holthausen 2002, Liggett et al. 2003), and is allowed under 36 CFR 219.19 (1982), the implementing regulations for the National Forest Management Act of 1976.

For a description of the process used to select these species and a summary of those considered but not selected, refer to the administrative record for the Emphasis Species Categories document. A total of 40 Threatened, Endangered, and Sensitive (TES) species are listed below, followed by 6 Management Indicator Species (MIS), 35 species of local concern, and 15 demand species. These species would be addressed in project analyses and design with plan implementation. TES designation requires the preparation of a Biological Assessment/Evaluation for projects, while MIS require specific analyses (NEPA) at the project level. Species of local concern and demand species would likely also be analyzed in projects, though with less rigor than the previous two categories. A short section on rationale for selection of MIS follows the table which lists the emphasis species. Monitoring prescribed for emphasis species is addressed in Chapter 4 of the Revised Plan.

It is also anticipated that changes to TES species and species of local concern designations may occur during the life of the Revised Plan as new information becomes available. However, it is not anticipated that the change of these lists would require any amendment or revision to the plan, unless habitat management issues are in conflict with plan direction or outputs.

The following table displays the emphasis species for the Revised Plan. Highlighted cells contain species added to the table or species for whose designation has changed since the 2005 Forest Plan went into effect. Effects to these species will be analyzed at the project level, as appropriate. While lynx are listed in the table, there have not been any confirmed recent sightings, and management for this species would only apply as directed by the forestwide strategy and standards and guidelines described in Chapter 1 of the Revised Plan.

Table C-1. Bighorn National Forest emphasis species categories.

Common Name	Scientific Name	Federal/State Ranking <sup>1</sup>	Natural Heritage Ranking <sup>2</sup>	Habitat	Occurrence on Forest <sup>3</sup>
<b>Threatened, Endangered, Proposed, Candidate and Region 2 FS Sensitive Species (TES)</b>					
<b>Fish</b>					
Yellowstone cutthroat trout	<i>Oncorhynchus clarki bouvieri</i>	Sensitive	G4T2S2	Riverine	Known in limited streams.
Mountain sucker	<i>Catostomus platyrhynchus</i>	Sensitive	G5/S5	Riverine	Known in the Tongue River drainage.
<b>Amphibians</b>					
Northern leopard frog	<i>Rana pipiens</i>	Sensitive	G5S3	Ponds, wetland, riparian	Known in limited areas.
Columbia spotted frog	<i>Rana luteiventris</i>	Sensitive	G4S2S3	Ponds, wetland, riparian	Known in limited areas.
Wood frog	<i>Rana sylvatica</i>	Sensitive	G5S2	Ponds, wetland, riparian	Known in limited areas.
<b>Mammals</b>					
Fringed myotis	<i>Myotis thysanodes</i>	Sensitive NSS2	G5/S1B/S 1N	Caves/mines & forested areas	Known in limited sites.
Spotted bat	<i>Euderma maculatum</i>	Sensitive NSS2	G4/S1B/SZ/N	Caves/mines & forested areas	None known on the Forest. Occurs in locations adjacent to the Forest.
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	Sensitive NSS2	G4/S1B/S 2N	Caves/mines	Known in limited sites.
Water vole	<i>Microtus richardsoni</i>	Sensitive NSS3	G5/S2S3	Riparian	Limited in known distribution.
American marten	<i>Martes americana</i>	Sensitive	G5/S3	Late successional conifer	Known in several areas.

<sup>1</sup> See descriptions of federal/state ranking codes at the end of the table.<sup>2</sup> See descriptions of Wyoming Natural Diversity Database codes at the end of the table.<sup>3</sup> Known plant occurrences as of May, 2005.

Common Name	Scientific Name	Federal/State Ranking <sup>1</sup>	Natural Heritage Ranking <sup>2</sup>	Habitat	Occurrence on Forest <sup>3</sup>
Wolverine	<i>Gulo gulo</i>	Sensitive NSS3	G4/S2	Spruce-fir, alpine tundra	Historic/Potential, with occasional sightings.
Canada lynx	<i>Lynx canadensis</i>	Threatened NSS2	G5/S1	Spruce-fir forests	Historic/Potential, with most recent sighting in 2003.
Rocky Mountain bighorn sheep <sup>4</sup>	<i>Ovis canadensis</i>	Sensitive/	G4G5	Rock/alpine meadow	Known/Historic. Shell watershed currently with <30 animals.
<b>Birds</b>					
Harlequin duck	<i>Histrionicus histrionicus</i>	Sensitive/ PIF II NSS3	G4/S1B/ SZ?N	Wetland/lake	Historic/Potential as sighted nearby.
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened / PIF I	G4/S2B/ S3N	Riparian/lake	No critical habitat or known nesting. Only migration or foraging use and no winter roosts. Potential future nesting.
Northern harrier	<i>Circus cyaneus</i>	Sensitive/ PIF III	G5/S4B/ S5N	Grasslands, shrub-steppe	Known, with many observations.
Northern goshawk	<i>Accipiter gentilis</i>	Sensitive/ NSS4/PIF I	G5/S2S3B /S4N	Mature conifer or aspen	Known, with several observations.
Peregrine falcon	<i>Falco peregrinus anatum</i>	Sensitive/ NSS3/PIF I	G4T3/S1B S2N	Canyons, cliffs, riparian	Known, though sporadic. Historic nesting on Forest.

<sup>4</sup> Designation changed from Species of Local Concern to Sensitive Species following the April 2007 update of the Region 2 sensitive species list.

Common Name	Scientific Name	Federal/ State Ranking <sup>1</sup>	Natural Heritage Ranking <sup>2</sup>	Habitat	Occurrence on Forest <sup>3</sup>
Greater sage grouse	<i>Centrocercus urophasianus</i>	Sensitive/ PIF I	G4/S3	Sage steppe	No leks (breeding) on the Forest. Late summer brood rearing primarily on west side of the Forest.
Flammulated owl	<i>Otus flammeolus</i>	Sensitive	G4/SA?B	Mature ponderosa/aspen	None known on the Forest. Occurs in locations adjacent to the Forest. Limited potential habitat.
Short-eared owl	<i>Asio flammeus</i>	Sensitive/ PIF I	G5/S2S3	Grassland, sage steppe	Known, though somewhat limited potential.
Boreal owl	<i>Aegolius funereus</i>	Sensitive/ NSS4/PIF II	G5/S2	Mature conifer	Known from limited sightings.
Lewis' woodpecker	<i>Melanerpes lewis</i>	Sensitive/ NSS3/ PIF II	G4/S2B/ SZN	Conifer/riparian	Known from limited sightings.
Three-toed woodpecker	<i>Picoides tridactylus</i>	Sensitive/ PIF II	G5/S3	Mature conifer	Known on several areas of the Forest.
Olive-sided flycatcher	<i>Contopus cooperi</i>	Sensitive	G4/S4B/ SZN	Mature conifer	Known on several areas of the Forest.
Loggerhead shrike	<i>Lanius ludovicianus</i>	Sensitive/ PIF II	G5/S4B/ SZN	Grassland	Known on fringes of the Forest where meadows occur.
Brewer's sparrow	<i>Spizella breweri</i>	Sensitive/ PIF I	G5/S3B/ SZN	Sage steppe	Known on several areas of the Forest.
Sage sparrow	<i>Amphispiza bellii</i>	Sensitive/ PIF I	G5/S3B/ SZN	Sage steppe	None known on the Forest.



Common Name	Scientific Name	Federal/State Ranking <sup>1</sup>	Natural Heritage Ranking <sup>2</sup>	Habitat	Occurrence on Forest <sup>3</sup>
Grasshopper sparrow	<i>Ammodramus savannarum</i>	Sensitive/NSS4/PIF II	G4S3	Grasslands	Known from limited sightings.
<b>Plants</b>					
Peculiar moonwort <sup>5</sup>	<i>Botrychium paradoxum</i> New taxon	Sensitive/	G2/S1	Mesic to wet subalpine mountain meadows.	Known from 1 occurrence on the Forest.
Upward-lobe moonwort <sup>6</sup>	<i>Botrychium ascendens</i>	Sensitive/SSC	G2G3/S1	Hummocky marshes and bogs	Known from 2 occurrences on the Forest.
Mountain lady's slipper	<i>Cypripedium montanum</i>	Sensitive/SSC	G4G5/S1	Shady forests and riparian shrublands at mid-elevations.	Known from 4 occurrences on the Forest.
Yellow lady's slipper	<i>Cypripedium parviflorum</i>	Sensitive/SSC	G5T?/S1S2	Damp mossy forests, and streamsides at mid-elevations.	Known from 3 occurrences on the Forest.
Russet cotton-grass	<i>Eriophorum chamissonis</i>	Sensitive/SSC	G5/S2	Montane swamps and bogs.	Known from 3 occurrences on the Forest.
Hall's fescue	<i>Festuca hallii</i>	Sensitive/SSC	G4/S2	Montane meadows	Known from 1 vague historical (1898) record.
Grass-of-parnassus	<i>Parnassia kotzebuei</i>	Sensitive/SSC	G4/S2	Moist seeps.	Known from 1 occurrence on the Forest.
Cary beardtongue	<i>Penstemon caryi</i>	Sensitive/SSC	G3/S3	Disturbed areas on sedimentary soils.	Known from 14 occurrences on the Forest.

<sup>5</sup> New taxon added following the April 2007 update of the Region 2 sensitive species list.

<sup>6</sup> Designation changed from Species of Local Concern to Sensitive Species following the April 2007 update of the Region 2 sensitive species list.

Common Name	Scientific Name	Federal/ State Ranking <sup>1</sup>	Natural Heritage Ranking <sup>2</sup>	Habitat	Occurrence on Forest <sup>3</sup>
Wooly twinpod	<i>Physaria didymocarpa</i> <i>var. lanata</i>	Sensitive/ SSC	G5T2/S2	Rocky outcrops and rocky soil, without dense grass or shrub cover. Forested areas.	Known from 4 occurrences on the Forest.
Hairy tranquil golden-weed	<i>Pyrocoma clementis</i> <i>var. villosa</i>	Sensitive/ SSC	G3G4T?/ S1	Sagebrush grasslands and montane meadows.	Known from 3 occurrences on Forest.
Northern blackberry	<i>Rubus arcticus ssp. acaulis</i>	Sensitive/ SSC	G5/S1	Riparian area along Sourdough Cr.	Known from 1 occurrence on the Forest.
Lesser bladderpod	<i>Utricularia minor</i>	Sensitive/ SSC	G5/S2	Submerged in ponds, slow moving streams	Known from 1 occurrence on the Forest.

**MIS/Focal Species****Fish**

Rainbow trout	<i>Oncorhynchus mykiss</i>	None	G5SE	Riverine, lakes	Known and widespread.
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**Mammals**

Beaver	<i>Castor canadensis</i>	Furbearer	G5/S5	Riparian	Known on several areas on the Forest. Reduced from historical levels.
Rocky Mountain elk	<i>Cervus elaphus nelsoni</i>	Big game	G5/S5	Generalist/ Mature conifer security areas.	Widespread on the Forest.
Red squirrel	<i>Tamiasciurus hudsonicus</i>	Small game	G5/S5	Mature conifer with CWD.	Widespread on the Forest.

**Birds**

Red-breasted nuthatch	<i>Sitta canadensis</i>	Non-game	G5/S5	Mature conifer w/snags	Widespread on the Forest.
Brewer's sparrow	<i>Spizella breweri</i>	Non-game/FS sensitive	G5/S3	Sagebrush	Widespread on the Forest where habitat occurs.

Common Name	Scientific Name	Federal/State Ranking <sup>1</sup>	Natural Heritage Ranking <sup>2</sup>	Habitat	Occurrence on Forest <sup>3</sup>
<b>Species of Local Concern</b>					
<b>Mammals</b>					
Long-eared myotis	<i>Myotis evotis</i>	NSS2	G5/S1	Caves/mines	Known, but in limited sites.
Hoary bat	<i>Lasiurus cinereus</i>	None	G5/S2B/SZ/N	Aspen/conifer, snags	None/Potential. Due to lack of aspen on the Forest, there may be less potential than in other areas of the state.
<b>Birds</b>					
Common loon	<i>Gavia immer</i>	PIF II/NSS1	G5/S1B/SZN	Wetland/lake	Known observations, but no known breeding.
Swainson's hawk	<i>Buteo swainsoni</i>	PIF I	G5/S4B/SZN	Grassland, riparian	Known in a few areas.
Great gray owl	<i>Strix nebulosa</i>	NSS4/ PIF II	G5/S2	Mature conifer	Suspected occurrence. Potential habitat on the Forest.
Pygmy nuthatch	<i>Sitta pygmaea</i>	NSS4/ PIF II	G5/S2S3	Mature conifer	Known, but from limited sightings.
Calliope hummingbird	<i>Stellula calliope</i>	PIF II	G5/S2B/SZN	Conifer, riparian	One known occurrence.
Golden-crowned kinglet	<i>Regulus satrapa</i>	PIF II	G5/S3	Spruce-fir	Known through limited occurrences.
<b>Plants</b>					
White larchleaf beard-tongue <sup>7</sup>	<i>Penstemon laricifolius</i> <i>ssp. exilifolius</i>	None/	G4T2Q/S2	Rocky, calcareous hills, bare soils	Known on the Forest.

<sup>7</sup> Designation changed from Sensitive Species to Species of Local Concern following the April 2007 update of the Region 2 sensitive species list.

Common Name	Scientific Name	Federal/ State Ranking <sup>1</sup>	Natural Heritage Ranking <sup>2</sup>	Habitat	Occurrence on Forest <sup>3</sup>
Leathery grapefern <sup>8</sup>	<i>Botrychium multifidum</i>	None/	G5/S2	Wet meadows and bottomlands	Known from 4 occurrences on the Forest
Musk root	<i>Adoxa moschatellina</i>	None/ SSC	G5/S2	Shady, moist, moss-rich limestone cliffs	Known – 2 1 in Leigh potential RNA
Aromatic pussytoes	<i>Antennaria aromatica</i>	None/ Watch	G3G4/S2	Open slopes/ridges, limestone talus at or above timberline	Known -1
Pygmy pussytoes	<i>Antennaria monocephala</i>	None/ SSC	G4G5/S1	Wind swept, open slopes, ridges in alpine or subalpine tundra	Known – 1 in Cloud Peak Wilderness
Lance-leaved grapefern	<i>Botrychium lanceolatum</i>	None/ SSC	G5T4/S1	Riparian areas, organic rich hummocks	Known -1
Mingan moonwort	<i>Botrychium minganense</i>	None/ SSC	G4/S1	Wide variety: riparian, moist meadows, sand dunes, prairies, woods.	Known – 2 1 in Mann Cr. potential RNA
Rattlesnake fern	<i>Botrychium virginianum</i>	None/ SSC	G5/S2	Calcium rich, moist shady areas	Known – 1 in Mann Cr. potential RNA
Mud sedge	<i>Carex limosa</i>	None/ SSC	G5/S2	Wetlands, often limey	Known from 1 occurrence on the Forest.
Short-leaved sedge	<i>Carex misandra</i>	None/ SSC	G5/S1	Alpine wet meadows, willows, streambanks	Known – 1 in McClain potential RNA

<sup>8</sup> Designation changed from Sensitive Species to Species of Local Concern following the April 2007 update of the Region 2 sensitive species list.

Common Name	Scientific Name	Federal/ State Ranking <sup>1</sup>	Natural Heritage Ranking <sup>2</sup>	Habitat	Occurrence on Forest <sup>3</sup>
Leafy thistle	<i>Cirsium foliosum</i>	None/ SSC	G5/S1	Moist areas along roads, meadows, slopes	Known -1
Fragile rockbrake	<i>Cryptogramma stelleri</i>	None/ SSC	G5/S1	Moist wooded slopes and limestone cliffs	Known – 1 in Cloud Peak Wilderness
White arctic whitlow-grass	<i>Draba fladnizensis</i> <i>var. pattersonii</i>	None/ SSC	G4T2T3/ S2	Fellfields and talus slopes above 1,000 feet	Known – 2 in Cloud Peak Wilderness
Woodland horsetail	<i>Equisetum sylvaticum</i>	None/ SSC	G5/S1	Preacher Rock Bog - riparian	Known - 1
Low fleabane	<i>Erigeron humilis</i>	None/ SSC	G4/S2	Granite and limestone cliff faces on moist mossy microsites	Known – 1 in Cloud Peak Wilderness
Howard forget-me-not	<i>Eritrichium howardii</i>	None/ SSC	G4/S1	Limestone outcrops and dry rocky areas	Known from 1 occurrence on the Forest.
Three-flower rush	<i>Juncus triglumis</i> <i>var. triglumis</i>	None/ SSC	G5T5/S1	Wet gravel slopes below melting snows	Known – 1 in Cloud Peak Wilderness
Watson's prickly-phlox	<i>Leptodactylon watsonii</i>	None/ SSC	G3G5/S1	Dry ledges on sedimentary cliffs.	Known from 1 occurrence on the Forest.
Northern twayblade	<i>Listera borealis</i>	None/ SSC	G4/S2	Moist, shady spruce forests.	Known from 2 locations on Forest.
Broad-leaved twayblade	<i>Listera convallarioides</i>	None/ SSC	G5/S2	Moist, shady spruce forests.	Known from 1 occurrence on Forest.
Sheathed musineon	<i>Musineon vaginatum</i>	None/ SSC	G3?/S2	Limestone outcrops, chugwater redbeds	Known – 6

Common Name	Scientific Name	Federal/ State Ranking <sup>1</sup>	Natural Heritage Ranking <sup>2</sup>	Habitat	Occurrence on Forest <sup>3</sup>
Alpine poppy	<i>Papaver radicatum</i> <i>ssp. kluanense</i>	None/ SSC	G3G4/S2	Alpine meadows, talus slopes and fellfields	Known – 1 in Cloud Peak Wilderness, plus additional unconfirmed reports
Mountain lousewort	<i>Pedicularis pulchella</i>	None	G3S2	Alpine meadows and alpine scree slopes	Known – 2 in Cloud Peak Wilderness
Large-leaved pondweed	<i>Potamogeton amplifolius</i>	None/ SSC	G5/S1	Slow moving streams and lakes	Known – 1 in Cloud Peak Wilderness
Wooly prince's plume	<i>Stanleya tomentosa</i> <i>var. tomentosa</i>	None/ None	G4T3/S2	Limber pine woodlands, juniper shrublands on limey-sandstone ridges, dry dolomite cliffs/talus	Known -1 near Shell Canyon Research Natural Area
Hapeman sullivantia	<i>Sullivantia hapemanii</i> <i>var. hapemanii</i>	None/ None	G3T3/S3	Limestone outcrops and boulders in shaded streams	Known from 14 occurrences on the Forest
Soft aster	<i>Symphyotrichum molle</i>	None/ None	G3/S3	Rocky calcareous soils in sagebrush or cinquefoil grasslands bordered by forests. Also limestone outcrops and redbeds.	Known from over 36 occurrences. Low priority for further inventory and monitoring due to increased known distribution and lack of threats.
<b>Demand Species</b>					
<b>Fish</b>					
Brook trout	<i>Salvelinus fontinalis</i>	None	G5SE	Riverine, lakes	Known and widespread.

Common Name	Scientific Name	Federal/State Ranking <sup>1</sup>	Natural Heritage Ranking <sup>2</sup>	Habitat	Occurrence on Forest <sup>3</sup>
Brown trout	<i>Salmo trutta</i>	None	G5SE	Riverine, lakes	Known in several streams.
Snake River cutthroat trout	<i>Oncorhynchus clarki ssp. 2</i>	None	G4T1T2Q	Riverine, lakes	Known
<b>Mammals</b>					
Mule deer	<i>Odocoileus hemionus</i>	Big game	G5/S5	Generalist	Known and widespread. Stable
Moose	<i>Alces alces shirasi</i>	Big game	G5/S5	Willow, riparian	Known and widespread. Stable - Increasing
Black bear	<i>Ursus americanus</i>	Game	G5/S5	Generalist	Known and widespread. Stable
Mountain lion	<i>Felis concolor</i>	Game	G5/S5	Generalist	Known and widespread. Stable
<b>Birds</b>					
Ruffed grouse	<i>Bonasa umbellus</i>	Upland game	G5/S5	Forested areas	Known in northern portion of the Forest. Stable
Blue grouse	<i>Dendragapus obscurus</i>	Upland game	G5/S5	Spruce-fir	Known and widespread. Stable
Merriam's turkey	<i>Meleagris gallopavo merriami</i>	Upland game	G5/S5	Ponderosa pine	Known primarily in southeast portions of the Forest. Stable - Increasing
Gray partridge	<i>Perdix perdix</i>	Upland game	G5/S5	Prairie, meadow, shrub	On fringes of Forest, mostly the west side. Likely stable.

Common Name	Scientific Name	Federal/State Ranking <sup>1</sup>	Natural Heritage Ranking <sup>2</sup>	Habitat	Occurrence on Forest <sup>3</sup>
Plains sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	Upland game	G4/S4	Grassland, mountain shrub	Known in the southeast corner of the Forest.
Chukar partridge	<i>Alectoris chukar</i>	Upland game	G5/S5	Grassland, mountain shrub	Known primarily on west side of the Forest
<b>Plants</b>					
Sweetgrass	<i>Hierochloe odorata</i>	None	None	Moist meadows.	Likely common.
Purple cone flower	<i>Echinacea angustifolia</i>	None	G4/S3	Dry open prairies and plains on sandy soils	Occurs near the Forest boundary, but has not been observed on the Forest, despite searches.

**NSS** = Native species status; state ranking; numbers 1 through 3 indicate those species recognized as high priorities for conservation action, with a 1 indicating possible extirpation.

**PIF** = Partners in Flight; state ranking; levels I and II identify species which may be of viability concern.

**SSC** = Species of special concern; derived primarily from the Fine Filter Analysis for the Bighorn National Forest (Welp et al 2000).

**G** = Global rank, based on the rangewide status of a species. **T** = Trinomial rank, based on the rangewide status of a subspecies or variety. **S** = state rank, based on the status of a taxon in Wyoming (state rank may differ in other states). **1** = critically imperiled because of extreme rarity or because of some factor of a subspecies' life history that makes it vulnerable to extinction. **2** = imperiled because of rarity or because of factors demonstrably making a species vulnerable to extinction. **3** = rare or local throughout its range or found locally in a restricted range. **4** = apparently secure, although the species may be quite rare in parts of its range, especially at the periphery. **5** = demonstrably secure, although the species may be quite rare in parts of its range, especially at the periphery. Source: Wyoming Natural Diversity Database (WYNDD), 4/29/05.

## Management Indicator Species (MIS) Synopsis

This section provides a summary of the process followed to select Management Indicator Species (MIS) for the Revised Plan. A complete document describing the five principles and seven steps in the selection process is available in the project record. MIS were selected based on Regional guidance documents and input from the Wyoming Game and Fish Department. MIS are not the only monitoring tool for tracking the effects of management activities on species and their habitat; other monitoring has been prescribed in



Chapter 4 (Monitoring and Evaluation) of the Revised Plan, particularly for other species at risk (e.g., threatened or sensitive species).

## Summary of MIS Selection Process

In the selection of MIS, **the first principle** involved identifying the priority issues for species viability and management effects to habitat that could be monitored and evaluated:

- ◆ Effects of commodity outputs and human uses, including timber harvest, livestock grazing, recreation use, and the associated road and trail networks.
- ◆ Importance of riparian habitat, watershed, and water quality related functions.
- ◆ Lack of information regarding species of limited distribution or with limited habitat requirements.
- ◆ Importance of old growth spruce/fir and all aspen habitat.
- ◆ Lack of ability to proactively manage habitats to maintain structural diversity, including forested and non-forested (shrub) communities.

**The second principle** was consideration of the major activities likely to occur on the Forest in the next planning period: livestock grazing, timber harvest, recreation use, and prescribed burning. In order to facilitate evaluation, the species selected needed to correspond to a forestwide condition or need and project level feasibility. Habitat aspects would be best evaluated if they can either be modeled and/or tracked through GIS systems and remote sensing due to the likelihood of continuing improvements and availability of this technology. The population monitoring requirement of the regulations should also contribute to this function.

**The third principle** was consideration of MIS selected on neighboring National Forests to provide regional consistency. This step was not as relevant in the selection process because there are no National Forests immediately adjacent to the Bighorn, and the closest Forests were all in the process of either revising their plans or amending their lists of MIS.

**The fourth principle** was consideration of whether MIS were the best method to monitor and evaluate the issue. For example, if aspen extent and health or the amount and distribution of old growth conifer were the issues, these habitats can be directly monitored, rather than using a surrogate of MIS. However, MIS are needed to monitor some species because knowledge for scientific habitat management is not complete and all effects are not known.

For the fourth principle, the following five categories of species were reviewed in compliance with the 1982 NFMA regulations at 36 CFR 219.19:

- ◆ Federally listed (under the Endangered Species Act) species.
- ◆ Species with special habitat needs that may be influenced by management activities.
- ◆ Species commonly hunted, fished, or trapped.
- ◆ Non-game species of special interest.

- ♦ Species whose population changes are believed to evaluate the effects of management activities.

Plants, animals, communities, or special habitats were considered as potential MIS. Species' habitat requirements and their population biology elements were considered in relation to management activities.

**The fifth principle** was selecting an adequate but limited number of species. This principle included evaluating the management complexity (e.g., issues, habitat diversity, size, human uses) of the Forest, the budgets available, and the relationship of MIS in the overall monitoring and evaluation plan.

## Results of MIS Selection Process

It is important to recognize that it is not necessary to select a species for each category or each management issue listed above. Species that represent multiple categories of the five listed were also prioritized. From the five principles and seven steps followed, six species were selected from more than 100 total considered. Rationale for not selecting other species is listed in the MIS document in the administrative record.

Table C-2. MIS species on the Bighorn National Forest and rationale for their selection.

Species Selected	Rationale (Issue or Habitat Represented, Monitoring Feasibility)
Elk	<p><b>Rationale</b></p> <p>Their relationship to management issues (vegetation management, road densities).</p> <p>Feasibility of modeling habitat (elk security).</p> <p>Feasibility of monitoring population trends (WGFD data).</p> <p>Possible indication of habitat for other species requiring forested cover away from roads (e.g. marten).</p> <p>Forest-wide distribution; forestwide and project scale analysis feasibility.</p> <p>Past management and public interest and focus all support selection.</p> <p><b>Challenges</b></p> <p>Populations are hunted, are affected by climate (drought and winter), may be less indicative of summer habitat conditions, and elk are capable of exploiting a variety of habitats.</p> <p>Past research provides information to support monitoring, and they were selected in the 2002 amendment as MIS.</p> <p>Unknown if elk behavior will change if security habitat is improved as elk currently use private land for security habitat.</p>

Species Selected	Rationale (Issue or Habitat Represented, Monitoring Feasibility)
<b>Red squirrel</b>	<p data-bbox="626 342 756 373"><b>Rationale</b></p> <p data-bbox="659 388 1430 562">Their use of Coarse Woody Debris (downed logs) in mature conifer habitats. They are most often associated with structural stages 4B,C and to a lesser extent 3B,C, and occur in higher densities in forested riparian areas, all of which are focuses of management activities.</p> <p data-bbox="659 577 1451 682">Monitoring feasibility is strong, and species is also serves as a “focal” species, since it is prey for marten, lynx, goshawks, and many other predators.</p> <p data-bbox="659 697 1154 728">Selected in 2002 amendment as a MIS.</p> <p data-bbox="626 743 773 774"><b>Challenges</b></p> <p data-bbox="659 789 1341 821">Tendency of populations to fluctuate with cone crops.</p> <p data-bbox="659 835 1438 867">Their ability to exploit and cross a variety of conifer habitats.</p>
<b>Red-breasted nuthatch</b>	<p data-bbox="626 888 756 919"><b>Rationale</b></p> <p data-bbox="659 934 1442 1039">Their year-round resident status and dependence on snags for nesting habitat in more mature conifer (structure stages 4B, 4C typically).</p> <p data-bbox="659 1054 1414 1159">Due to their audible detections, they are feasible to monitor through avian point counts, and have a forest-wide distribution.</p> <p data-bbox="659 1173 1414 1205">They were also selected in the 2002 amendment as an MIS.</p> <p data-bbox="626 1220 773 1251"><b>Challenges</b></p> <p data-bbox="659 1266 1360 1297">Their ability to use a variety of mature conifer habitats.</p>
<b>Brewer’s sparrow</b>	<p data-bbox="626 1318 756 1350"><b>Rationale</b></p> <p data-bbox="659 1365 1455 1501">Their association with mature sagebrush habitats, which are in decline in lands surrounding the Forest, and management activities involve prescribed burning and grazing in these habitats on the Forest.</p> <p data-bbox="659 1516 1430 1621">Audible detections in avian point count monitoring and their good distribution in sage habitats across the Forest are also desirable features.</p> <p data-bbox="659 1635 1435 1701">They may provide indication of suitability of habitat for sage grouse.</p>

Species Selected	Rationale (Issue or Habitat Represented, Monitoring Feasibility)
	<p><b>Challenges</b></p> <p>Their status as a migratory species, with the Forest only used as habitat in the breeding season.</p> <p>They may provide indication of suitability of habitat for sage grouse.</p>
Rainbow trout	<p><b>Rationale</b></p> <p>Existing population monitoring by WGFD and the Forest.</p> <p>Widespread distribution (unlike Yellowstone cutthroat trout).</p> <p>The species responds well to habitat changes influenced by management activities.</p> <p>Though introduced, it is well distributed across the Forest, and meets the monitoring priority for riparian habitat.</p> <p><b>Challenges</b></p> <p>The influence of climate and fishing harvest, and the possible need to reduce some populations to benefit native trout distribution.</p>
Beaver	<p><b>Rationale</b></p> <p>Their documented importance in riparian system functioning.</p> <p>Ability to provide habitat for other species.</p> <p>Acceptable monitoring protocols (cache inventory from aerial or ground based methods) at forest and project scale.</p> <p>Native status.</p> <p>Forestwide distribution (though currently limited).</p> <p>Their need for adequate habitat (willows) in the presence of planned management actions (grazing, recreation use, road maintenance).</p> <p><b>Challenges</b></p> <p>A lack of populations compared to historic levels.</p> <p>Reintroduction efforts.</p> <p>Possible disease interactions.</p>

## Plan Implementation

MIS species will be used in the planning, analysis, and design of projects implemented under the Revised Plan. MIS may be evaluated using qualitative and quantitative habitat measures correlated to existing and likely population and habitat trends. The R2 HABCAP model may be suitable for use with the red-breasted nuthatch and the red squirrel for analysis purposes, comparing forest-wide conditions of habitat with anticipated project results to habitat. Acres of potential versus suitable habitat should be assessed in project level decisions for each applicable MIS. MIS may be selected from the six species listed above for project analysis based on the habitat being manipulated or anticipated project effects.

Monitoring for MIS species is also required at the Forest level. The monitoring protocols for each species are described in Chapter 4 – Monitoring and Evaluation, with further details in the MIS Selection Process document in the project record.

Revisions to MIS species used for monitoring and evaluation may occur through plan amendment or the next revision in response to improvements in knowledge or monitoring technologies or change in policy.

In addition, two particular forest-wide guidelines that were developed to provide guidance for habitat for MIS/TES received considerable debate and needed further clarification with regards to implementation in projects. These two guidelines include **elk security** and the **300' forested riparian area**, and are described in Appendix A of the Revised Plan.