BIOLOGICAL ASSESSMENT AND EVALUATION

FOR

REVISED LAND AND RESOURCE MANAGEMENT PLANS

AND

ASSOCIATED OIL AND GAS LEASING DECISIONS

Little Missouri National Grassland
Sheyenne National Grassland
Cedar River National Grassland
Grand River National Grassland
Denbigh Experimental Forest
Souris Experimental Forest
Buffalo Gap National Grassland
Fort Pierre National Grassland
Oglala National Grassland
Nebraska National Forest
Samuel R. McKelvie National Forest
Thunder Basin National Grassland

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Appendix H Biological Assessment and Evaluation

Section 1. Introduction

Land and Resource Management Plans (LRMP) provide long-term management direction and land allocation for National Forest System (NFS) lands. Federal regulations (36 CFR 219) require that LRMPs be revised on a 10 to 15 year cycle. To respond to this regulatory requirement, revised LRMPs for eight National Grasslands, two experimental forests and two National Forests on the northern Great Plains have been prepared. In addition, oil and gas leasing decisions, including direction on what lands are available to be leased, what stipulations will apply, and the decision to authorize Bureau of Land Management to lease the lands will be made for five areas. BLM will make leasing decisions for certain lands under their jurisdiction within these five areas.

Section 2 of the Endangered Species Act (ESA) mandates that "all federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act." Section 5 of ESA directs the Secretary of Agriculture to establish and implement a program to conserve fish, wildlife, and plants, including those protected under the Act. Section 7 of the Act directs all federal agencies to utilize their authorities in furtherance of the purposes of the Act by carrying out programs for the conservation of endangered and threatened species. Section 7 also directs departments and agencies to ensure that their actions are not likely to jeopardize the continued existence of any threatened or endangered species or result in destruction or adverse modification of their critical habitats. It also requires all federal departments and agencies to consult with the Secretary of Interior or Secretary of Commerce (marine species only) whenever an authorized action is likely to affect a listed or proposed species and / or its critical habitat. The **biological assessment** portion of this specialist report is the internal process used by the Forest Service to determine if proposed actions, a preferred LRMP alternative (Alternative 3) in this case, jeopardize any plant or animal species protected under the Act or proposed for such protection, and if consultation with the Secretary of Interior is necessary.

It is also the policy of the Forest Service (FSM 2670.32) to avoid or minimize impacts to species whose viability has been identified as a concern (sensitive species). Viability concerns have been identified for a relatively large number of Great Plains plant and animal species that are not currently protected under ESA. The **biological evaluation** portion of this specialist report discloses the predicted effects of management direction and decisions in the revised LRMPs and oil and gas leasing decisions on sensitive species. Alternative 3 is summarized as follows:

> This multiple-use alternative would modify the current Management Plan direction by adopting additional special area designations, such as Research Natural Areas, Special Interest Areas, and placing added emphasis on native plants and animals and recreation opportunities.

Alternative 3 is explained in more detail in Chapter 2 of the FEIS, and management direction under the preferred alternative is presented in the revised LRMPs.

Under Alternative 3, direction pertaining to oil and gas development is provided and includes direction on what lands are available for leasing, which specific lands are authorized for leasing, and what lease stipulations will apply to protect other resources, including biological resources. Oil and gas decisions are made for the Little Missouri, Cedar River, Thunder Basin and Oglala National Grasslands, and portions of the Grand River and Buffalo Gap National Grassland. The oil and gas analysis includes all federal oil and gas mineral ownership within those units whether federal or non-federal surface ownership. Accordingly, this biological assessment and evaluation applies to all lands with federal mineral ownership within the boundaries of the planning units for which oil and gas decisions are being made.

Forest Service and Bureau of Land Management (BLM) both make oil and gas leasing decisions based on the referenced analysis and this biological assessment. The Forest Service leasing decisions apply only to Federal minerals under Federal surface. In conjunction with the Forest Service, BLM also makes leasing decisions for Federal minerals under federal surface. Additionally, BLM makes a leasing decision for Federal minerals under non-federal surface within the boundaries of national grasslands and forests. BLM is responsible for implementing the leasing decisions by offering leases for sale and issuing them once they are sold. Implementation of the leasing decisions is not part of the LRMP revision process. However, leases are advertised for sale and issued consistent with the direction provided in the leasing decisions and the analysis on which the decisions are based.

Ground-disturbing activities are not authorized under the leasing decisions. Under the oil and gas leasing regulations at 36 CFR 228.102, ground disturbing activities can only be authorized upon approval of an Application for Permit to Drill (BLM) and accompanying Surface Use Plan of Operations (Forest Service). Such approval requires both Forest Service and BLM compliance with the National Environmental Policy Act and other applicable laws and regulations, including the ESA, at the time the action is proposed.

The analyses and results presented in this report were conducted by Forest Service biologists and botanists and represent the biological findings (determinations) of the Forest Service for threatened, endangered, proposed, candidate, and sensitive species. These species, plus those listed under state endangered species laws, are collectively referred to as “species at risk” in this report and in the FEIS and revised LRMPs. The list of federally threatened, endangered, and proposed species in the planning area was recently updated (September 8, 2000) by the U.S. Fish and Wildlife Service. The biological determinations in this report are based on the predicted effects of the management direction in the revised LRMPs and associated oil and gas leasing

decisions on each of these species. This biological assessment and evaluation is intended to be dynamic and may be updated when any of the following occur:

- A LRMP and/or oil and gas leasing decision is amended or revised,
- Additional species are brought under the protection of ESA,
- Additional species are proposed for protection under ESA,
- Critical habitat is designated or proposed,
- New significant information on a listed or proposed species becomes available,
- Additional species are identified as sensitive by the Forest Service,
- Occurrence of a listed, proposed, candidate, or sensitive species on a national grassland or forest where it had not been previously reported.

Area Affected

This biological assessment and evaluation addresses a combined planning effort for the following national grasslands and forests:

- Dakota Prairie Grasslands (administrative unit)
  - Little Missouri National Grassland (LMNG)*
  - Sheyenne National Grassland (SNG)
  - Grand River and Cedar River National Grasslands (GR/CRNG)*
- Medicine Bow-Routt National Forest (administrative unit)
  - Thunder Basin National Grassland (TBNG)*
- Nebraska National Forest (administrative unit)
- Oglala National Grassland (ONG)*
- Fort Pierre National Grassland (FPNG)
- Buffalo Gap National Grassland (BGNG)*
- Nebraska National Forest - Pine Ridge Ranger District (NNF-PRRD)
  - Nebraska National Forest – Bessey Ranger District (NNF - BRD)
  - Samuel R. McKelvie National Forest (SRMNF)

* Oil and gas leasing decisions apply to these planning units.

Two small experimental forests in North Dakota, Denbigh and Souris, are also administered as part of the Dakota Prairie Grasslands.

In this document, the term “planning unit” is used to refer to individual national grasslands or forests listed above. The term “planning area” refers collectively to the states of North Dakota, South Dakota, Nebraska, and Wyoming. The planning units combined encompass nearly three million acres, widely scattered over the four states. The planning area encompasses 250 million acres within Montana, Wyoming, North Dakota, South Dakota, and Nebraska. Although these public lands account for just over one percent of the northern plains, they are important for the ecological values, products, recreation, and educational opportunities they provide. These unique units of the National Forest System incur demands for livestock grazing, recreation, oil, gas, and mineral production and are recognized as significant contributors to the livelihoods

and life-styles of local citizens. They are also recognized as an important ecological resource and as significant contributors to wildlife habitat and biological diversity on the Great Plains, a region where federal and other public lands with conservation mandates are relatively small components of the larger landscape (Sieg et al. 1999).

From a broad-scale perspective, more than half of the ecosystems in this country that are determined to be critically endangered (more than 98% loss or degradation) are grasslands and an additional 24% are shrublands (Noss et al. 1995). The Great Plains, once the continent's largest ecosystem and considered by many to be the most characteristic of the United States, is now one of most altered and fragmented grassland ecosystems (USDA Forest Service 2000, Ostlie et al. 1997). Approximately 60% of the grasslands on the Great Plains have been converted to row-crop agriculture (Lauenroth et al. 1999). Wetland and aquatic resources within this region have also undergone major impacts from a host of factors including pollution, waste disposal, irrigation, drainage, power generation (Northern Great Plains Aquatic Assessment, Ostlie et al. 1997). A closer look at the amount of grasslands lost in the states within the northern plains is presented below:

Table H-1. Decline in Grassland Acres in the Northern Plains States.

Prairie Type and State	Past Area (acres)	Current Area (acres)	Decline (percent)
Tall-grass			
Nebraska	15,067,000	303,800	98.0
South Dakota	6,422,000	49,400	99.2
North Dakota	321,100	300	99.9
Mixed-grass			
Nebraska	190,190,000	4,693,000	75.3
South Dakota	3,952,000	1,185,600	70.0
North Dakota	35,074,000	11,115,000	68.3
Short-grass			
South Dakota	442,100	287,400	35.0
Wyoming	7,410,000	5,928,000	20.0

Sources: USDA Forest Service 2000 and Samson et al. (1998).

In addition to the loss of grasslands, much of the remaining grasslands and shrublands are being invaded by aggressive and non-native plant species, at the expense of native flora and fauna. The suppression and alteration of major ecological disturbances, primarily fire and herbivory, that helped shape today's biological communities across the Great Plains also add to the cumulative impacts to many of the species at risk in this region (USDA Forest Service 2000, Ostlie et al. 1997).

Biological Assessment and Evaluation Process

Supporting Information and Pre-field Review

Three lists of plant and animal species were developed. These lists included both terrestrial and aquatic plant and animal species. The first list is presented in **Table H-2** and includes those species currently protected under the Endangered Species Act and at risk of extinction throughout their range (range-wide imperilment). The second list in **Table H-3** includes those species that are candidates for listing under ESA or ranked by The Nature Conservancy and Natural Heritage Program (TNC / NHP) as G-2 (imperiled) or G-3 (vulnerable) species. These species may also be at risk of range-wide imperilment. The third and final list in Table H-6 includes species that may be at risk regionally or at a state level. Region 1 and / or 2 of the Forest Service classifies many of the species in **Table H-3** and Table H-6 as sensitive. The occurrence of each species on each individual National Grassland and Forest is also presented in each of the three tables. In addition to the Northern Great Plains Terrestrial and Aquatic Assessments, numerous other information sources were consulted or contacted to help develop these lists. These sources included but were not limited to: U.S. Fish and Wildlife Service, Bureau of Land Management, state wildlife agencies, Forest Service records, TNC / NHP databases, other government agency lists, species lists of various conservation organizations, species specialists, and published and unpublished scientific references. Many of the published references summarized museum records. A committee of scientists also reviewed these lists for accuracy and completeness. Where available, information on the distribution of species within individual national grasslands and forests was compiled and mapped.

Information on species at risk and their habitats was obtained from a large volume of published and unpublished references (see *References Consulted* section at the end of this document). The following websites were searched for information on each species at risk:

- Northern Plains Wildlife Research Center (www.npwrc.usgs.gov).
- Association for Biodiversity Information (www.natureserve.org).
- Great Plains National Grasslands (www.fs.fed.us / r2 / nebraska / gpng).

Species specialists were also consulted for several species. Throughout the biological assessment and evaluation process, FS biologists and botanists consulted with biologists from the U.S. Fish and Wildlife Service on habitat and management needs for listed, proposed and candidate plant and animals species. This information was used to help support the biological determination process and to identify conservation measures needed in the revised LRMPs to provide for the recovery and viability of species at risk on the national grasslands and forests. Forest Service biologists also consulted with BLM biologists and staff specialists regarding oil and gas development effects on species at risk and lease stipulations to protect biological resources. The draft biological assessment and evaluation was also sent to BLM for their review and comments.

Several recent broad-scale assessments also provided valuable context, as well as species information, in support of the biological assessment and evaluation. These assessments included:

- Northern Great Plains Terrestrial Assessment (USDA Forest Service 2000).
- Northern Great Plains Aquatic Assessment (Johnson 1998).
- An Ecological History of the Northern Plains (unpublished Forest Service report).
- The Status of Biodiversity in the Great Plains (Ostlie et al. 1997).
- Rare Plant Communities of the Northern Plains (Faber-Langendoen et al. 1997).
- The U.S. Northern Great Plains Steppe Assessment Map (Chuluun et al. 1997).
- America's Northern Plains: An Overview and Assessment of Natural Resources (Natural Resources Conservation Service 1996).
- Our Living Resources: a Report to the Nation on the Distribution, Abundance, and Health of U.S. Plants, Animals, and Ecosystems (LaRoe et al. 1995).
- Status and Trends of the Nation's Biological Resources (Mac et al. 1998).
- Terrestrial Ecoregions of North America: a Conservation Assessment (Ricketts 1999).
- Freshwater Ecoregions of North America: a Conservation Assessment (Abell 2000).

In addition to the broad-scale assessments listed above, numerous other key references also provided valuable insights and broad-scale information on species at risk, biological communities, and / or habitat conditions and trends across the Great Plains. These publications included:

Bogan, M.A. 1995. A biological survey of Fort Niobrara and Valentine National Wildlife Refuges. USDI National Biological Service, Final Report. 193pp.

Grossman, D.H., and K.L. Goodin. 1995. Rare terrestrial ecological communities of the United States. Pages 218 – 221 in LaRoe et al. Our living resources: a report to the nation on the distribution, abundance, and health of U.S. plants, animals and ecosystems. USDI National Biological Service. 530pp.

Joslin, G., and H. Youmans (coordinators). 1999. Effects of recreation on Rocky Mountain wildlife: a review for Montana. Montana Chapter of The Wildlife Society. 307pp.

Knight, R.L., and K.J. Gutzwiller. 1995. Wildlife and recreationists: coexistence through management and research. Island Press, Washington, D.C. 372pp.

Laurenroth, I.C. Burke, and M.P. Gutmann. 1999. The structure and function of ecosystems in the central North American grassland region. Great Plains Research, 9(2):223-260.

Pederson, R.L., D.G. Jorde, and S.G. Simpson. 1989. Northern Great Plains. Pages 281-310 In L.M. Smith, R.L. Pederson, and R.M. Kaminski (eds.) Habitat management for migrating and wintering waterfowl in North America.

Peterjohn, B.J., J.R. Sauer, and S. Orsillo. 1995. Breeding bird survey: population trends 1966-92. Pages 17 – 21 in LaRoe et al. Our living resources: a report to the nation on the distribution, abundance, and health of U.S. plants, animals and ecosystems. USDI National Biological Service. 530pp.

Robson, D.B. 1999. Reasons for prairie plant rarity. Pages 92 – 95 in J. Thorpe et al. (eds.). Proceedings of the fifth prairie conservation and endangered species conference. Provincial Museum of Alberta, Natural History Occasional Paper No. 24. 384pp.

Samson, F.B, and F.L. Knopf, (eds). 1996. Prairie conservation: conserving North America's most endangered ecosystem. Island Press, Washington D.C. 339pp.

Sidle, J.G. 1999. Species of concern on the North American Great Plains and their occurrence on national grasslands. Pages 349 – 353 in J. Thorpe et al. (eds.). Proceedings of the fifth prairie conservation and endangered species conference. Provincial Museum of Alberta, Natural History Occasional Paper No. 24. 384pp.

Sieg, C.H., C.H. Flather, and S. McCanny. 1999. Recent biodiversity patterns in the Great Plains: implications for restoration and management. Great Plains Research, 9(2):277-314.

From these sources and others we learned that across the United States, grassland and shrubland birds are experiencing the most widespread declines of any group of species and that conservation measures are needed to reverse these significant downward trends (Peterjohn et al. 1995, Knopf 1995). We also found out that the Great Plains is one of the most impacted and altered ecoregions on earth. These broad-scale assessments were also useful references for helping identify the primary threats to species at risk and their habitats across the Great Plains, and each of the assessments listed above is maintained as part of the administrative record for the revised LRMPs.

The broad-scale assessments and the additional references listed above were especially useful in helping identify direct, indirect, and cumulative effects and impacts to species at risk in the northern Great Plains planning area. Another important information source consulted during the biological assessment and evaluation process for several wildlife species was a working draft of "*Species of Common Conservation Concern in North America*" prepared under the guidance and facilitation of the Commission for Environmental Cooperation. The Commission was formed because of the North American Agreement on Environmental Cooperation (Canada, Mexico, United States). This draft provided scientific information compiled by species experts on the conservation needs of many migratory and transboundary species. Recovery plans for each of the threatened and endangered species and the 12-month administrative findings reports from the U.S. Fish and Wildlife Service were also key references for species classified as candidates for ESA protection.

A geographic information system (GIS) was developed to support this planning effort. This system included basic soils, water, topography, and vegetation information. The information was used to help evaluate the quantity and quality of potential habitat for species at risk. Information on the documented distribution of species at risk on each national grassland and forest was also included in the system and used for analysis to support this biological assessment and evaluation.

Field Reconnaissance

Surveys and inventories for listed and proposed species like the black-footed ferret, bald eagle, American burying beetle, blowout penstemon, mountain plover, Ute ladies' tresses and western prairie fringed orchid have been conducted for many years by various individuals, organizations, and government agencies. They include, but are not limited to, the Forest Service, U.S. Fish and Wildlife Service, universities, and state wildlife and natural resource agencies. Incidental sightings of species like the whooping crane have also been recorded.

Additional surveys and inventories have been conducted by the Forest Service and/or others for species like the swift fox, sturgeon chub, greater prairie chicken, sage grouse, California bighorn sheep, western burrowing owl, regal fritillary butterfly, tawny crescent butterfly, Barr's milkvetch and Dakota buckwheat. Many surveys focused on candidate species and species designated as sensitive by the Forest Service. The Forest Service has surveyed and inventoried black-tailed prairie dog colonies for many years.

Information gathered from these surveys, inventories, and observations was used to help describe and determine species distributions, habitat use, and habitat suitability.

Analysis of Effects

The expected effects to species at risk under Alternative 3 are disclosed in this document. These evaluations include direct, indirect, and cumulative effects. Cumulative effects are described at the scale of the northern Great Plains planning area, unless otherwise specified. Interrelated and interdependent actions are also identified and considered. The effects, expressed as biological determinations, are based on the assumption that the conservation measures, standards and guidelines in the revised LRMPs, are fully implemented and strategically located to benefit species at risk. Although it's acknowledged that objectives are not in themselves on-the-ground conservation measures, like standards and guidelines, they are included in the Conservation Measures section in each species or guild evaluation. Monitoring direction is also included in the Conservation Measures section of each evaluation.

Biological assessments and evaluations prepared by the Forest Service during the mid 1990s for the reissuance of a large number of livestock grazing permits in the planning area were valuable references and are maintained as part of the administrative record for this planning effort. These documents provided considerable information on the direct, indirect, and cumulative effects of livestock grazing on many of the species addressed in this biological assessment and evaluation.

The number of plant and animal species listed in Table H-2, Table H-3, and Table H-6 is relatively large. To reduce the amount of unnecessary analyses, any species listed in the tables that meet one or both of the following criteria (screens) was eliminated from further detailed analyses:

- Screen 1 - (Importance of Area)
- Presence of the species is questionable or incidental and/or the presence of potential and suitable habitat on or near the national grassland or forest is unknown or questionable or the amount of potential and suitable habitat is negligible.
- Screen 2 - (Threats)

- The species or potential and suitable habitat for the species may occur, but it's highly unlikely that land uses and allocations authorized by the Forest Service would significantly affect the species and / or its habitat either on NFS lands or downstream.

Those species eliminated from further detailed analyses are listed near the beginning of Sections 2, 3, and 4.

Effects of the programmatic management direction in the revised LRMPs for the following management activities were evaluated for the species listed in the three tables:

- Livestock grazing.
- Vegetation management.
- Plant and animal damage control.
- Fish and wildlife management.
- Recreation management.
- Travel and motorized use.
- Special area designation.
- Existing and projected oil and gas development (effects of management direction and final leasing decisions).

Effects analyses were conducted using information and data gathered in the pre-field review and field reconnaissance, in conjunction with information from both published and unpublished references, species specialists, and experienced Forest Service biologists and botanists.

Effects were analyzed for each individual species listed in Table H-2 and Table H-3 and most species in Table H-6. Effects analyses for many of the plant species in Table H-6 were discussed and presented for guilds or plant groups.

Biological Determinations

This biological assessment and evaluation process culminates with a biological determination of the likely effects of each alternative on each species or plant guild. The determinations and not the natural history information in this document are intended to be the focus of this assessment and evaluation. The primary purpose was not to reiterate and document the complete life histories of each species but to document the determinations and the most relevant information supporting each determination. The types of determinations that can be made for those species protected under ESA are determined by the U.S. Fish and Wildlife Service and National Marine Fisheries Service (1998). The determinations (and abbreviations) made for federally listed and proposed species are as follows:

- No effect.
- Is not likely to adversely affect.
- Is likely to adversely affect.
- Is likely to jeopardize a proposed species / adversely modify proposed critical habitat.
- Is not likely to jeopardize a proposed species / adversely modify proposed critical habitat.

Direction in Forest Service Manual 2670 establishes the types of determinations for Forest Service-designated sensitive species. The determinations (and abbreviations) made for these species are as follows:

- No impact.
- Beneficial impact.
- May adversely impact individuals but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability range-wide.
- Likely to result in a loss of viability on the planning area, in a trend to federal listing, or in a loss of species viability range-wide.

The determination options presented above for sensitive plant and animal species relate primarily to the impacts of Alternative 3 on the viability of sensitive species populations on each national grassland and forest within the planning area. The determination option for each species or plant guild is chosen after considering the likely effects or impacts of human activity, direct mortality risks, and habitat conditions (quality, quantity, and distribution). The merits and rationale for the biological determination for each species or plant guild were evaluated by several Forest Service biologists and botanists with the final determination for each species being the primary responsibility of the biologist or botanist from the respective administrative unit. It's important to point out that selection of the "may adversely impact individuals but not likely to result in a loss of viability..." determination does not imply mortality and may relate to indirect effects on individual animals.

All biological determinations assume that the conservation measures and management direction (both standards and guidelines) specified in the EIS or LRMPs will be implemented in a timely manner or evaluated at the site-specific project level and implemented if biologically appropriate. It's also assumed that objectives will be met in a timely manner or that measurable progress will be made in meeting the objectives over the next 10 to 15 years. It's also assumed that monitoring will be conducted as indicated in Chapter 4 of the LRMPs to determine the effectiveness of management direction. If some of these assumptions prove to be incorrect, the probability that some of the biological determinations made in this document are inaccurate will likely increase.

Specific biological determinations are not made for those species in Table H-3 and Table H-6 that are not designated as sensitive by the Forest Service. However, the expected effects are still evaluated and discussed.

Risk Assessment

In addition to the biological determinations discussed above, Forest Service biologists and botanists completed a risk assessment to further characterize the anticipated effects of Alternative 3 on population viability. The primary purpose of the assessment was to obtain additional information to be used to help establish monitoring priorities. Those species with higher risk levels would be higher priorities for monitoring. The assessment was completed for most threatened, endangered, proposed and sensitive species known to occur on or in the vicinity of each national grassland and forest and consisted of biologists and botanists selecting from the following menu of risk outcomes:

- **Outcome I** Implementation of Alternative 3 will eventually provide for habitat of sufficient quality, quantity, and distribution on and in the vicinity of the national grassland or forest to help maintain well-distributed populations of the species across its range on the planning unit. The concept of well distributed must be based on the distribution of potential and suitable habitat on the planning unit. Land uses are managed to avoid or reduce direct and indirect threats, and other factors such as disease, competition, or invasion of exotic species are not recognized as significant threats. There's no need for re-introductions, transplants or supplemental stocking since any unoccupied but suitable habitat will likely be repopulated through dispersal.
- **Outcome II** Implementation of Alternative 3 will eventually provide for habitat of sufficient quality, quantity and distribution on and in the vicinity of the national grassland or forest to help maintain populations of the species distributed across its range on the planning unit. However, some local populations or sub-populations may be at risk in localized areas due to management activities and / or reduced habitat quality and quantity. Land uses are managed to avoid or reduce direct and indirect threats in most areas, and other factors such as disease, competition, or invasion of exotic species may be local concerns but are not recognized as significant and widespread threats. The species will likely repopulate suitable but unoccupied habitats on the planning unit, and there's no need for re-introductions, transplants or supplemental stocking.
- **Outcome III** Implementation of Alternative 3 will eventually provide habitat of sufficient quality, quantity and distribution on and in the vicinity of the national grassland or forest to help maintain some populations of the species but with significant gaps in the historic distribution across the planning unit. Under Alternative 3 these gaps are likely to remain and will result in some limitation of interactions among local populations. Land uses are managed to avoid or reduce direct and indirect threats in some areas, and threats from other factors such as disease, competition, or invasion of exotic species may be local concerns but are not recognized as significant and widespread threats on the planning unit. Habitat enhancement and reintroductions or transplants may be needed to restore the potential distribution of the species in suitable but unoccupied habitat in the planning unit. Successful reintroductions or transplants of this species have been demonstrated.
- **Outcome IV** Implementation of Alternative 3 will eventually provide habitat of sufficient quality, quantity and distribution on and in the vicinity of the national grassland or forest to help maintain some populations of the species across its range on and in the vicinity of the national grassland or forest but with significant gaps in the historic distribution. Under Alternative 3, these gaps are likely to remain and will result in some limitation of interactions among local populations. Land uses are managed to avoid or reduce direct and indirect threats across some of the species' habitat on the planning unit, and threats from other factors such as disease, competition, or invasion of exotic species may be local concerns but are not recognized as significant and widespread threats on the planning unit. Habitat enhancement and reintroductions or transplants may be needed to restore the potential distribution of the species in suitable but unoccupied habitat on the planning unit. Successful reintroductions or transplants have not been demonstrated.

Risk Assessment, cont.

- **Outcome V** Implementation of Alternative 3 will most likely result in the species eventually existing in refugia on or in the vicinity of the national grassland or forest with strong limitations on interactions among local populations. Land uses may be managed to avoid or reduce direct and indirect threats but only in localized areas, and threats from other factors such as disease, competition or invasion of exotic species may be recognized as significant and widespread threats on the planning unit. Possible extirpation in response to environmental extremes or stochastic events such as prolonged drought, flooding, or hail cannot be ruled out. Habitat enhancement and reintroductions or transplants will be needed to restore populations and recover the potential distribution of the species in suitable but unoccupied habitat on the planning unit. Successful reintroductions or transplants have been demonstrated.
- **Outcome VI** Implementation of Alternative 3 will most likely result in the species eventually existing in refugia on or in the vicinity of the national grassland or forest with strong limitations on interactions among local populations. Land uses may be managed to avoid or reduce direct and indirect threats but only in a few localized areas, and threats from factors such as disease, competition or invasion of exotic species may be recognized as significant and widespread threats on the planning unit. Possible extirpation from the planning unit as a result of environmental extremes or stochastic events such as a prolonged drought, flooding, or hail cannot be ruled out. Habitat enhancement and reintroductions or transplants will be needed to restore populations and recover the potential distribution of the species in suitable but unoccupied habitat on the planning unit. Neither reintroductions nor transplants have been successfully demonstrated.

These outcomes are progressively ordered so that Outcome I represents those conditions with the highest probability of providing for well-distributed populations on or in the vicinity of the national grasslands or forests over the next 10 to 15 years, while Outcome VI includes those conditions with the lowest probability of providing for well distributed populations. Under Outcome VI, extirpation of the species from the vicinity of the national grassland or forest could occur as a result of a catastrophic event such as a widespread hailstorm, wildfire, flood or extended and serious drought. For most species, a single outcome was selected, but because of a higher level of uncertainty, two outcomes were identified for some species. It's acknowledged that, due to the multiple criteria within each outcome, some criteria in a selected outcome for an individual species may not apply. The selected outcome simply represents what is believed to be the "best fit" under the management direction prescribed under Alternative 3. No outcomes were selected and presented in this document for those situations where a "no effect" or "no impact" determination is made because of the absence or apparent absence of a species. Outcomes are only provided for those species known or confirmed to occur on the national grasslands or forests in the planning area. Like the biological determinations, the merits and rationale for the risk assessment for each species or plant guild were evaluated by several Forest Service biologists and botanists with the final risk assessment for each species being the primary responsibility of the biologist or botanist from the respective administrative unit.

Section 2. Biological Assessment for Species Protected Under the Endangered Species Act and at Risk of Range-wide Imperilment

Table H-2. Species Protected Under the Endangered Species Act and at Risk of Range-wide Imperilment.

	National Grassland or Forest									
Species	**LMNG**	**GRCRNG**	**SNG**	**TBNG**	**BGNG**	**FPNG**	**ONG**	**NNF PRRD**	**NNF BRD**	**SRMNF**
Blowout penstemon									K	PSH
Western prairie fringed orchid			K						PSH	PSH
Ute ladies'-tresses				PSH	PSH					
American burying beetle						PSH			K	P
Whooping crane	K	P			K	K	PSH	PSH	PSH / OS	PSH / OS
Bald eagle	K	K	K	K	K	K	K	K	K	K
Black-footed ferret	PSH	PSH		PSH	K	PSH	PSH		PSH	PSH
Mountain plover				K	PSH		PSH			
Topeka shiner									PSH / OS	PSH / OS

K = Known occurrence in vicinity; date of last observation suggests that species still occurs in area,

P = Possible but unconfirmed occurrence,

PSH = Species occurrence is unlikely or questionable; within species range and potential or suitable habitat may occur,

OS = Possible off-site occurrence (downstream, etc.)

Species Eliminated From Further Analysis

Screen 1 (Importance of Area)

Buffalo Gap National Grassland = Blowout Penstemon (Penstemon haydenii)

- Rationale: This species has not been reported on or near the Buffalo Gap National Grassland. Although the FWS included blowout penstemon on the species list for this area, the FS is unaware and does not suspect any potential or suitable habitat on or near this area. FS will consult with FWS if the species or potential or suitable habitat is eventually found on or near the national grassland.

Buffalo Gap National Grassland = Ute Ladies' Tresses (*Spiranthes diluvialis*)

- Rationale: This species has not been reported on or near the Buffalo Gap National Grassland. Although the FWS included Ute ladies' tresses on the species list for this area, the FS is unaware and does not suspect any potential or suitable habitat on or near this area. FS will consult with FWS if the species or potential or suitable habitat is eventually found on or near the national grassland.

Fort Pierre National Grassland = American Burying Beetle (*Nicrophorus americanus*)

- Rationale: Surveys for this species were conducted in 1993 on the Fort Pierre National Grassland, but no occurrences were or have been reported on or near this area. FS will consult with FWS if the species is eventually found on or near the national grassland.

Nebraska National Forest (Bessey Ranger District) and Samuel R. McKelvie National Forest = Black-footed Ferret (*Mustela nigripes*)

- Rationale: There are no current or historic occurrences of this species documented in or near the national forests. These areas of the Nebraska Sandhills do not have the potential for prairie dog colonies of sufficient size and number to support black-footed ferret populations. FS will consult with FWS if the species is eventually found on or near these national forests.

Screen 2 (Threats)

Nebraska National Forest (Bessey Ranger District) and Samuel R. McKelvie National Forest = Topeka shiner (*Notropis topeka*)

- Rationale: There are no current or historic occurrences of this species documented in waters on, near or downstream from the national forests. If the species did occur on or near this area, it is highly unlikely that any management direction under Alternative 3 could significantly affect instream flow or water quality for this species in the sandhill rivers. FS will consult with FWS if the species is eventually found on or near these national forests.

Nebraska National Forest (Pine Ridge Ranger District) = Whooping Crane (*Grus americana*)

- Rationale: Several years ago, a single whooping crane was observed using a pond on private land near the national forest. However, there is no known suitable wetlands habitat on the national forest. FS will consult with FWS if the species is eventually observed on or near the national forest.

Oglala National Grassland = Whooping Crane (*Grus americana*)

- Rationale: There are no current or historic occurrences of this species documented on or near this area. FS will consult with FWS if the species is eventually found on or near the national grassland.

Species Assessments

Blowout Penstemon (*Penstemon haydenii*)

Key references consulted for information on this species included the national recovery plan (U.S. Fish and Wildlife Service 1992), Flessner and Stubbendieck (1989), Stubbendieck et al. (1989), Stubbendieck et al. (1993), Fritz (1998), Weedon et al. (1982) and Great Plains Flora Association (1986). The Great Plains National Grasslands web site (www.fs.fed.us/r2/nebraska/gpng) was consulted for maps and information on the current distribution of the species.

Species Description

Blowout penstemon is a perennial forb of the figwort family that buds in early May and flowers from mid-May through late June. Primary pollinators appear to be several species of megachilid bees (Lawson et al. 1989). Seed capsules open in late July or August. Seeds fall near the base of the plant or become windborn. However, most reproduction occurs by rhizomes, and seedlings are rare (Stubbendieck et al. 1993, Weedon et al. 1982). The stems of this plant root adventitiously, thus maintaining the plant in shifting sands of blowouts (U.S. Fish and Wildlife Service 1992). It is the rarest plant endemic to the Great Plains (Stubbendieck et al. 1989).

Distribution and Status

Blowout penstemon is listed as endangered under ESA. Table H-2 summarizes species occurrence in the planning area. Over 900 plants were recently transplanted at two locations on the Nebraska National Forest (USDA Forest Service 2000), but prior to this, blowout penstemon had not been found during surveys on the Nebraska or Samuel R. McKelvie National Forests. However, a single population occurs on state school lands adjoining the Samuel R. McKelvie National Forest. The type specimen for this species was collected near the Nebraska National Forest circa 1900.

The species is mostly endemic to the Nebraska Sandhills, and naturally occurring populations are now restricted to seven areas in the sandhill region. To date, transplants have occurred on six properties including private ranches and national wildlife refuges in addition to the recent transplants on the Nebraska National Forest (USDA Forest Service 2000). Also, one additional population was recently located in eastern Wyoming on BLM land in Carbon County.

The plant has been propagated in greenhouses to safeguard the species and to provide stock for transplants back into suitable sites (Flessner and Stubbendieck 1989), although those greenhouse facilities are scheduled to close soon.

ESA Status and Other Organization Rankings

ESA -Endangered; TNC / NHP - G1, N1; NE - Endangered

Habitat

The species was once common in active sandhill blowouts. Blowout penstemon requires blowouts that are devoid or nearly devoid of vegetation, sites usually created by a combination of disturbance processes and characterized by active wind erosion. The species is considered a narrow-range species (Northern Great Plains Terrestrial Assessment) by only occurring in a single habitat with a very narrow set of physical and biological parameters. It is a successional plant, colonizing blowouts just after the sand begins to stabilize (Flessner and Stubbendieck 1989). The species declines with vegetation recovery. Historically, repeated fires and bison grazing were believed to maintain active blowouts for this species.

Blowout penstemon is usually found on the leeward side of craters within blowouts. These blowouts should not be confused with areas around windmills where livestock congregate and cause active wind erosion. Suitable blowouts are generally active and move across the landscape.

The Samuel R. McKelvie and Nebraska National Forests contain significant potential and suitable habitat for the species. Surveys for suitable blowout habitat were conducted on these areas from 1991 through 1994, and the results were as follows:

	NNF (BRD)	SRMNF
Number of Blowouts Surveyed	286	296
Number of Suitable Blowouts	50	44
Total Acres of Suitable Blowouts	30	28

Surveys for this species were also conducted on the South Dakota portion of the planning area in 1999, within the Grand River / Cedar River National Grasslands. The surveys were conducted in the Grand River Sand Dunes, an area of actively moving sand dunes located adjacent to the Grand River (USFS files, Medora Ranger District). Blowout penstemon was not found.

Recovery and Conservation Planning

A recovery plan was approved in 1992 (U.S. Fish and Wildlife Service 1992). According to the plan, this species will be considered for delisting when a minimum of 15,000 individuals is established in at least ten population groups. Each population group must have at least 300 plants. Current population estimates for the Nebraska Sandhills indicate that there are approximately 2,200 plants concentrated in seven naturally occurring population groups and another 9,000 plants in several transplant sites.

The recovery plan calls for the following:

- Protection of naturally occurring, reintroduced, and introduced populations and their habitat.
- Systematic surveys for additional naturally occurring populations and suitable habitat for establishing new populations.
- Development of propagation techniques
- Reintroduction of populations in areas of historic occurrence.
- Introduction of new populations in suitable habitat within the species range
- Various related tasks.

Blowout penstemon reintroductions have already been initiated on the Valentine National Wildlife Refuge and Nebraska National Forest.

The University of Nebraska greenhouse facility that grows penstemon seedlings is closing. The closure will greatly impede penstemon plantings and the achievement of recovery goals. Growing penstemon seedlings is relatively easy and an appropriate facility could be established at the Bessey nursery located on the Nebraska National Forest. The nursery could become the focal point of penstemon recovery throughout the Sandhills.

Direct and Indirect Effects on NFS Lands

Fire suppression can contribute to stabilization and increased vegetation cover on the sandhills, thereby reducing the number and size of suitable blowouts for reintroduction and establishment of new populations of this species.

Range management practices that incorporate reduced stocking rates and periodic rest from livestock grazing to increase vegetative cover and production can reduce the amount of suitable blowout habitat.

High livestock grazing intensities resulting in early seral vegetation and reduced amounts of vegetative cover can promote blowouts and thereby increase the amount of suitable habitat for this species.

Season-long livestock grazing can result in the grazing of blowout penstemon plants and loss of some reproductive opportunity (Fritz 1998). Shorter duration grazing did not demonstrate any significant effect on flowering plants. The investigator suggested that higher stocking rates could have altered the results of the study.

Prescribed burning, if strategically placed, could accelerate expansion of existing suitable blowout penstemon habitat.

The success of future transplants could be threatened by an ever-increasing use of blowouts by off-road and all-terrain vehicles, especially on the Nebraska National Forest near Halsey (U.S. Forest Service 2000). This use could cause direct mortality of recent transplants or established plants.

Invasive and non-native plants can compete with blowout penstemon for habitat.

Herbicide drift could result in loss of blowout penstemon plants.

Cumulative Effects

Range management practices on private lands in the Nebraska Sandhills can either enhance or reduce habitat suitability for blowout penstemon, depending primarily on the intensity and duration of grazing. Livestock grazing practices that reduce range conditions and vegetative cover enhance opportunities for blowout establishment. The latest information indicates that during the late 1980s, approximately 3% of the rangelands in the Nebraska Sandhills (333,000 acres) were in poor range condition (USDA 1989) and the opportunity for maintenance and establishment of blowouts is probably greatest in this condition class. At this time, there is no reason to expect significant changes in grazing practices or a significant change in current overall range condition and trends across the Sandhills. Therefore, the amount of suitable habitat for blowout penstemon is expected to remain relatively stable.

Active fire suppression has occurred for decades in the Sandhills. It is expected to continue, on both public and private lands, within the range of blowout penstemon. At this time, there is no reason to expect significant changes in the level of fire suppression occurring across the Nebraska Sandhills or in the amount of suitable habitat for the species.

Land use conversion of sandhills prairie for crop production through center-pivot irrigation development has altered approximately 3 to 4 percent of the Nebraska Sandhills (Bio / West, Inc. 1986, USDA 1989, Bleed and Flowerday 1990), and this has undoubtedly reduced or destroyed some potential blowout penstemon habitat. However, the number of acres under center-pivot irrigation has leveled off (Bleed and Flowerday 1990), and there's currently no reason to expect this trend to change appreciably in the near future.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a grazing permit. High intensity grazing can enhance habitat for blowout penstemon, especially if combined with other disturbance processes. At the same time, continuous or high intensity livestock grazing can cause mortality or reduced reproductive success of individual plants through grazing of plants, trampling, and habitat alteration.

Conservation Measures

The following conservation measures are presented as management direction under Alternative 3 in the revised LRMP:

Unit-wide Direction (Chapter 1)

- None

Geographic Area Direction (Chapter 2)

NNF (BRD) and SRMNF

- The objectives to provide specified amounts of early seral and low structure grasslands on both of these areas are summarized in Table H-5 and H-6 in Section 5 of this document.
- An objective of 50 to 250 acres of prescribed burning annually is established for both the Nebraska and Samuel R. McKelvie National Forests. If strategically located, this activity could enhance existing blowout penstemon habitat.
- Initiate blowout penstemon transplants into suitable habitat to eventually establish at least 2 populations on each national forest. (Objective and Standard)
- Retain selected blowouts that are suitable reintroduction sites through maintenance of disturbance processes (Standard).
- Protect naturally occurring and transplanted penstemon populations and their habitat (Standard).
- Conduct target surveys for naturally occurring penstemon populations (Standard).
- Implement travel management restrictions if damage occurs to blowout penstemon populations (Standard).
- Prioritize noxious weed control in occupied habitat (Standard).
- Restrict pesticide use where it would have adverse effects on the species (Standard).

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

NNF (BRD) and SRMNF

- Continue monitoring populations and habitat.

Biological Determinations, Risk Assessments, and Rationale

NNF (BRD)

Determination is "not likely to adversely affect." Suitable habitat and transplant sites will be maintained on the national forest, and protection measures are provided to prevent or reduce the loss of plants to management activities and land uses. Transplants have been demonstrated to be successful and an adequate number of transplant sites exist on private and public lands to meet the objectives of the recovery plan. Direction is provided to establish at least 2 populations on this planning unit. Outcome V was selected for the risk assessment. The rationale for Outcome V is the species will most likely continue to exist in refugia with strong limitations on interactions between populations. Gene transfer between existing populations by pollen or seed dispersal is virtually non-existent and there's likely a high potential for genetic isolation (Caha et al. 1998). Re-establishment of any natural or transplanted populations that are lost in the future will likely require transplants. The biological determination and the risk outcome are based on the assumption that greenhouse facilities will be available to produce stock for future transplants.

SRMNF

Determination is "no effect." There are no known populations of blowout penstemon on this national forest. There is suitable habitat for transplants, and this habitat will be maintained. Protection measures to prevent or reduce the loss of plants resulting from future transplants to management activities and land uses are provided. Direction is provided to establish at least 2 populations on this planning unit.

Western Prairie Fringed Orchid (*Platanthera praeclara*)

The national recovery plan for this species (U.S. Fish and Wildlife Service 1996) and the Recovery Strategy for Western Prairie Fringed Orchid on the Sheyenne National Grassland (USDA Forest Service 2000) were primary references for information on this species. The Northern Prairie Wildlife Research Center web site (www.npwrc.usgs.gov) was also reviewed for information on this species and its habitat.

Species Description

The western prairie fringed orchid is a perennial forb with large and showy inflorescences containing as many as 20 or more cream-colored flowers arranged on a spike. The lower petal of each flower is deeply lobed and fringed, hence the common name. Plants are usually 30 to 85 cm tall and have two to five relatively thick, elongate, glabrous leaves (Sheviak and Bowles 1986).

This species reproduces primarily by seed, with flowering occurring between late June and mid-July and seed dispersal (wind and water) occurring in mid-September on the Sheyenne National Grassland. Flowering patterns are often erratic, and some information suggests that the plant commonly undergoes periods of dormancy (Bowles 1983). Although the orchid is reportedly long-lived (Sheviak and Bowles 1986), more recent demographic data collected on the Sheyenne National Grassland demonstrate that most plants live 3 years or less (Sieg and King 1995). The species is self-compatible, but pollination is required for fruit and seed production (U.S. Fish and Wildlife Service 1996). Two species of hawkmoths have been identified as pollen vectors for the orchid on the National Grassland (Cuthrell and Rider 1993).

High numbers of the orchid correspond to years of above average precipitation. However, excessive flooding or drought can cause local population declines and extinction (Sieg and King 1995). In addition, vegetative orchids may result when physiological requirements are not met or when microhabitat conditions are not conducive to flower production (Goh et al. 1982.).

Distribution and Status

The distribution of the species includes Minnesota, Iowa, Missouri, Nebraska, North Dakota, and Manitoba. It is believed to be extirpated from South Dakota and Oklahoma. Table H-2 summarizes species occurrence in the planning area. Known populations of the species on NFS lands within the planning area are found only on the Sheyenne National Grassland. Small isolated populations are found on the Valentine National Wildlife Refuge near the Nebraska and Samuel R. McKelvie National Forests, but the species was not found on either NFS unit during surveys in the early 1990s. Potential and suitable habitat has also not been identified on either national forest.

The orchid population on the Sheyenne National Grassland is one of three remaining large metapopulations of this species. The other two metapopulations occur in Minnesota and Manitoba, Canada. Small populations are found throughout the rest of the species remaining range.

Because the orchid is associated with wetlands, mapped wetlands on the Sheyenne National Grassland provide the best estimate of potential or suitable acres of habitat. U.S. Fish and Wildlife Service National Wetland Inventory data (2000) show that approximately 6,722 acres of suitable wetland habitat are found on the Sheyenne National Grassland. Because orchid populations shift in time and space in response to water levels (Hof et al. 1999), not all of these wetland acres will support orchids in a given year.

Acres of occupied habitat on the Sheyenne National Grassland are based on the locations of known populations mapped during surveys conducted from 1982 to 2000 by the U.S. Forest Service, North Dakota Natural Heritage Program, and others. Occupied habitat is estimated to be approximately 3,091 acres. These surveys indicate an estimated population size of 9,759 flowering orchids for the Sheyenne National Grassland (North Dakota Natural Heritage database 2000). This represents the total of the highest number of flowering plants recorded for all survey sites.

ESA Status and Other Organization Rankings

ESA - Threatened; TNC / NHP - G2.

Habitat

This species is associated with sedge meadows primarily within the tallgrass prairie biome. It occurs in the Hummocky Sandhills habitat association and the Deltaic Plain habitat association (Manske 1980) on the Sheyenne National Grassland. Sieg and Bjugstad (1994), and Wolken (1995) provide detailed information on species composition and soil characteristics of orchid habitat in the Sheyenne National Grassland. Across its range, the species is generally found in fire and grazing adapted grassland communities, most often on unplowed calcareous prairies and sedge meadows (U.S. Fish and Wildlife Service 1996). It has also been documented in successional plant communities on disturbed sites.

Maintenance of functional, dynamic tallgrass prairie is key to survival of the species. Disturbances such as fire, flooding, and grazing occurred historically and may be important for orchid regeneration.

Recovery and Conservation Planning

A recovery plan was approved in 1996 (U.S. Fish and Wildlife Service 1996). Since the species is listed as threatened rather than endangered and most of the existing plants occur on lands in a protective ownership, the recovery plan emphasizes the need for actions that prevent further declines in orchid populations and habitat quality. The recovery plan focuses on protecting the habitat of the remaining populations from conversion to agricultural use and assuring that the frequency, timing, and intensity of management practices enhance or maintain orchid populations. According to the recovery plan, the species will be considered for delisting when sites that include occupied habitat harboring 90 percent of the plants in each ecoregion are protected under public ownership or at higher levels of protection.

The Forest Service and others have prepared a "Recovery Strategy for the Western Prairie Fringed Orchid on the Sheyenne National Grassland." This document is included as Appendix N of the Dakota Prairie Grassland LRMP. This recovery strategy is specific and describes authorized uses and management practices on the Sheyenne National Grassland.

Critical habitat has not been designated for this species.

Direct and Indirect Effects on NFS Lands

Burning, livestock grazing, and mowing can have positive or negative effects on western prairie fringed orchid populations, depending on frequency, intensity, and timing of the activity (U.S. Fish and Wildlife Service 1996).

Burning may directly impact orchids through mortality of individual plants and indirectly through effects on habitat. It has been suggested that flowering may be suppressed by litter accumulation and stimulated by fire (Bowles 1983).

Livestock may impact orchids directly through both grazing and trampling and indirectly through effects on orchid habitat. The influence of livestock grazing on orchid populations is related to when and how many times the grazing occurs, how long livestock are left in the pasture, and the stocking rates and is interconnected with other management activities (such as burning and mowing) and climatic conditions. Grazing systems that encourage heavy repeated grazing throughout the growing season are more likely to be detrimental to individual orchids, both in terms of reducing carbohydrate reserves and in preventing seed production. Livestock grazing may also negatively impact alternate plant hosts for orchid pollinators. Yet, some grazing may be important for regeneration by reducing competition from other vegetation.

Repeated mowing prevents orchids from completing their life cycle and reduces carbohydrate reserves needed for growth the following season.

A serious threat to orchid viability and recovery is the increase of non-native, invasive species like leafy spurge (U.S. Fish and Wildlife Service 1996). Leafy spurge occupies approximately 11,000 acres on the Sheyenne National Grassland. It has been documented in orchid habitat (Sieg and Bjugstad 1994), although the extent of the infestation is unknown. Leafy spurge reduces the quality of orchid habitat but at the same time, efforts to control spurge and other exotics with chemicals pose a direct threat to orchids and may also impact alternate host plants for orchid pollinators.

Any activities that lower water tables below the root zone of orchids have the potential of seriously reducing orchid populations (U.S. Fish and Wildlife Service 1996).

Roads can negatively affect populations of orchids by introducing non-native plant species along travel routes, by habitat fragmentation, and by loss of suitable habitat to disturbance.

Cumulative Effects

The Direct and Indirect Effects listed above are also likely to continue on private and other public lands near the Sheyenne National Grassland.

Loss of habitat is a threat on private lands. The tallgrass prairie ecosystem has been reduced to less than 4 percent of its original size (Steinauer and Collins 1996). Most orchid habitat on private lands has already been destroyed or highly altered, and most of these lands will remain unsuitable or poor quality for orchids. As much as 5 to 15 percent of the native prairie has been converted to cropland in the last 15 years (Natural Resources Conservation Service 1999) and it is expected that the decline of habitat on private lands can be expected to continue. Discussions in the Northern Great Plains Aquatic Assessment (Johnson 1998) indicate that some of the most extensive draining of wetlands in the planning area has occurred in the Red River Valley of North Dakota where approximately 1.2 million acres of wet meadows may have been drained.

Livestock grazing and mowing practices on native tallgrass prairie that are unfavorable for the conservation of orchids are likely to continue on some private lands.

Development activities such as road and building construction on private lands will continue, resulting in some loss of suitable habitat for the western prairie fringed orchid.

Insecticide spraying on adjacent croplands may reduce or threaten insect pollinators for the orchid.

For the Sheyenne National Grassland area, it has been suggested that pumping of water from the Sheyenne aquifer for irrigation and other uses may impact available water for the orchid. In the vicinity of the Sheyenne National Grassland, irrigation development began in 1977. As of 1998, the North Dakota State Water Commission had approved an annual ground-water appropriation for 19,129.9 acre-feet. This is 15 percent of the average annual recharge of ground water in the area of the Sheyenne Delta acquifer (North Dakota Water Commission 1998).

Data from North Dakota Water Commission observation wells show that any water-level fluctuations caused by irrigation withdrawals are masked by water-level fluctuations caused by natural variations in recharge and discharge. Based on observations from 1977 through 1997, water levels have primarily followed changing climate patterns, with decreases in years of low precipitation and increases in years of high precipitation (ibid).

Although data do not reveal impacts to Sheyenne Delta water levels from current wells, trends indicate that the number of irrigation wells has increased steadily since 1977. In addition, the Sheyenne Delta area was identified as an area with potentially irrigable acres in the North Dakota State Water Commission's State Water Management Plan (1999). Water use near the National Grassland may increase, and additional impacts to orchid populations on the National Grassland are possible if water tables are lowered through water management practices on and off the National Grassland.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a grazing agreement. Livestock grazing can probably have adverse or beneficial effects on orchid, depending on timing, intensity, and duration.

Conservation Measures

The following conservation measures are presented as management direction under Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

SNG

- Protect hydrologic regimes and wetlands (Standards, Guidelines).

Geographic Area (Chapter 2)

SNG

- Provide quality grassland and wetlands habitat (Objective, Guidelines).
- Protect hydrologic regimes in wetlands (Objective, Standards).
- Provide the ecological processes necessary to ensure that orchids set and disperse seed at levels necessary to support stable to increasing orchid populations (Objective, Guideline).
- Manage orchids and their habitat on the Sheyenne National Grassland according to the current recovery strategy (Standard).

SNG, cont.

- The recovery strategy mentioned above and additional direction in Chapter 2 address orchid needs relative to livestock grazing, mowing, burning, noxious weed control, revegetation, travel, construction, water management, and other activities and uses (Standards, Guidelines).

NNF (BRD), SRMNF

- In consultation and coordination with the U.S. Fish and Wildlife Service, evaluate opportunities for establishing orchid populations and implement if suitable habitat exists (Standard).

Management Area Direction (Chapter 3)

SNG

- Western prairie fringed orchid populations are found in the proposed 240-acre Fritillary Prairie RNA and the proposed 370-acre Platanthera RNA. RNAs will be managed to protect their ecological values. Management plans will be completed within 5 years.

Monitoring Direction (Chapter 4)

SNG, NNF (BRD), SRMNF

- Continue monitoring populations and habitat.

Appendices

SNG

- Recovery strategy for western prairie fringed orchid (see Appendix N in the Land and Resource Management Plan for the Dakota Prairie Grasslands).

Biological Determinations, Risk Assessment and Rationale

SNG

Determination is "not likely to adversely affect." The recovery strategy presented as an appendix to the revised LRMP provides state-of-the-art knowledge to guide conservation and protection of the species on the Sheyenne National Grassland. This determination is based solely on effects of Forest Service-authorized activities and land uses on the orchid. Other factors mostly or partly beyond the control of the Forest Service, such as the continued spread of leafy spurge and other exotic vegetation, and impacts to the water table, continue to be serious threats to the species on the Sheyenne National Grassland and long-term viability of local populations remains uncertain.

Outcome IV is the selected risk assessment under Alternative 3. The rationale is that implementation of the recovery strategy and relevant standards and guidelines provides for specific conservation measures to protect and enhance populations in terms of their sizes and distribution. In addition, the increased levels of rest and prescribed fire are likely to benefit the orchid. Alternative 3 also prescribes management for stable to increasing populations of the orchid by providing quality grasslands and wetlands, maintaining hydrologic regimes, and providing appropriate ecological processes.

Although Outcome IV is expected, Outcome VI may be more appropriate if other events become major factors in the future. These events could include the continued spread of noxious weeds, alteration of the hydrologic regime on and adjacent to the Sheyenne National Grassland, or environmental stochasticity such as drought.

NNF (BRD) and SRMNF

Determination is "no effect." There are no known populations of orchids on these areas. The availability of potential and suitable habitat will be determined.

Ute ladies' tresses (*Spiranthes diluvialis*)

The draft recovery plan (U.S. Fish and Wildlife Service 1995) for this species was a primary source of information on this species.

Species Description

Ute ladies' tresses is a perennial forb in the orchid family. It was first described as a species in 1994. It generally blooms from late July through August but, depending on location and climatic conditions, may bloom in early July or still be in flower as late as early October (U.S. Fish and Wildlife Service 1995). Its seeds are very small and require specific symbiotic association with mycorrhizal fungi for germination (Arditti 1992). Like other orchid species, some plants may germinate and remain underground in a saprophytic state for many years before emerging. After emerging, individual plants may survive annual periods of dormancy and bloom only rarely. Reproduction appears to be strictly sexual, with bumblebees (*Bombus* spp.) as the primary pollinators (Dresler 1981, Sheviak 1984, Sipes et al. 1993).

Distribution and Status

Table H-2 summarizes species occurrence in the planning area. Target surveys in priority areas on the Thunder Basin National Grassland were conducted for this species in 1998 by a highly qualified botanist. Only one priority area on the national grassland was not surveyed. The species was not located on the national grassland during these surveys. The closest population to the national grassland occurs within several miles on public domain lands administered by the Bureau of Land Management in Converse County (Wyoming Natural Heritage Program database 2000). Another population occurs along the Niobrara River on public domain lands in Niobrara County, Wyoming.

The species is presently found in 26 locations in Wyoming and Nebraska, with additional sites in Colorado, Utah, Idaho, Montana, and Washington. Thirty-two populations are known to occur across this area.

ESA Status and Other Organization Rankings

ESA - Threatened; TNC / NHP - G2

Habitat

This species inhabits moist soils in mesic or wet meadows, gravel bars, wet streambanks, and old oxbows between elevations of 4,300 to 7,000 feet (Stone 1993). Jennings (1990) observed that the orchid seems to require "permanent sub-irrigation," indicating a close affinity with floodplain areas where the water table is near the surface throughout the growing season and into the late summer or early autumn. This orchid colonizes early successional riparian habitats subject to seasonal flooding from snowmelt and intermittent heavy thunderstorms. It is not tolerant of long-term standing water and emergent vegetation development.

Recovery and Conservation Planning

A draft recovery plan for this species was prepared in 1995. This draft does not include population and habitat recovery goals and delisting criteria. The recovery plan direction focuses on restoring natural stream dynamics (hydrologic patterns).

Critical habitat has not been designated for this species.

Direct and Indirect Effects on NFS Lands

Properly functioning riparian systems provide conditions favorable for establishment and maintenance of riparian-dependent species such as Ute ladies' tresses. Certain management activities in both riparian zones and uplands can cause a loss of equilibrium within riparian systems resulting in excessive flooding events along drainageways, sedimentation, and/or channelization. Excessive removal of vegetation on uplands can result in rill, sheet, and gully erosion and high rates of soil and water runoff.

Increased rates of channelization in drainages can result in lowered water tables. Activities that lower water tables below the root zone of Ute ladies' tresses place individual plants or populations at risk.

Development of springs and seeps for livestock water can result in loss of suitable riparian habitat for Ute ladies' tresses populations. Many springs have been developed in the past for livestock and the net loss of these habitat types is very high in many parts of the Grassland.

Livestock grazing and burning can have positive, neutral, or negative effects on Ute ladies' tresses depending on frequency, intensity, and timing of the disturbance and the life history characteristics of Ute ladies' tresses.

Burning may directly affect Ute ladies' tresses by causing mortality of individual plants or by impacting habitat. Most perennial species such as Ute ladies' tresses are not permanently injured by burn events, however some species mortality may occur especially during hot burn events. Burning may affect habitat for Ute ladies' tresses by removing shade and cover, and reducing moisture conditions needed for survival.

At the same time, burning may invigorate Ute ladies' tresses habitat and enhance nutrient cycling in the soil. Most wetland and riparian habitats did not experience as frequent a fire regime as more upland habitats.

Grazing and burning can reduce dead material in plant communities and open up canopy layers of plants, allowing for the germination and establishment of new plants of Ute ladies' tresses. Although certain levels of livestock grazing have been shown to enhance populations of Ute ladies' tresses, repeated or excessive grazing may prevent the species from completing its life cycle and may also reduce carbohydrate reserves.

Livestock trampling in riparian areas and repeated visits to these areas for water can be a problem under some circumstances for Ute ladies' tresses. Populations of Ute ladies' tresses grow in wet and subirrigated soils that may be especially susceptible to trampling. Excessive and repeated soil compaction may result in reduced plant vigor. Individual plants may be directly affected by trampling.

Competition from non-native invasive plants can be a significant threat to Ute ladies' tresses. Invasive plants such as Kentucky bluegrass, smooth brome, and other species often form monocultures within riparian habitats, significantly reducing the diversity of native plant communities. Invasive species can out compete Ute ladies' tresses and reduce population numbers. Invasive species are often spread by livestock grazing and recreational activities.

Noxious weeds such as Canadian thistle reduce the quality of habitat for Ute ladies' tresses but at the same time, efforts to control Canadian thistle and other invasive species with chemicals can pose a direct threat to the species. In addition, many chemicals are restricted for use within riparian zones.

Ground-disturbing activities associated with oil, gas, mineral, and other types of development could put populations of this orchid at additional risk.

Roads can negatively affect plant populations of Ute ladies' tresses by introducing non-native plant species along travel routes, by habitat fragmentation, and by loss of suitable habitat to disturbance.

Recreation can have negative effects depending on type of recreational use, road and trail use patterns and intensities, rate of spread of invasive, non-native plant species along recreational routes, and other factors. Even limited recreation use on fragile wetland habitat may be detrimental to Ute ladies' tresses. Trampling to Ute ladies' tresses from recreational uses can result in loss of plants.

Grasshopper spraying has the potential to impact insect pollinator populations. Specific pollinator information for this plant species is not well known.

Cumulative Effects

Development activities such as road building and other construction on private lands will continue resulting in some loss of suitable habitat for the plant species and some possible mortality of sensitive plants and population loss.

Livestock grazing practices that are unfavorable for the conservation of sensitive plant species are likely to continue on some private lands.

Oil and gas exploration and development on public domain land has the potential to impact populations of this species. The Bureau of Land Management has oil and gas stipulations to protect and conserve riparian areas and could also use standard lease terms to avoid impacts to this species.

Interrelated and Interdependent Actions

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development. Although the decision to make areas available for oil and gas leasing does not result in on-the-ground activities, oil and gas stipulations to protect and conserve threatened and endangered species and their habitats are needed at the time leasing availability decisions are made. Site-specific biological assessments and evaluations are also conducted at the time applications for permits to drill are considered by the Forest Service.

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures

There are no known occurrences of this species on the national grassland. If the species is eventually found on the national grassland or potential and suitable habitat is identified, the Forest Service will consult with the U.S. Fish and Wildlife Service.

Biological Determinations, Risk Assessments, and Rationale

TBNG

Determination is "no effect" since the species has not been found on this unit nor has potential and suitable habitat been identified. Surveys have been conducted but one additional area may need to be surveyed in the future. If the species is eventually found on the National Grassland, the U.S. Fish and Wildlife Service will be consulted to help insure that reasonable and prudent alternatives and conservation recommendations are implemented to protect and conserve the species on the National Grassland.

American Burying Beetle (*Nicrophorus americanus*)

The national recovery plan (U.S. Fish and Wildlife Service 1991) was a primary reference for information on this species.

Species Description

These beetles are the largest carrion beetles in the United States (U.S. Fish and Wildlife Service 1991). These insects require carrion up to 10 ounces in size for reproduction and generally produce only 1 brood annually (Lomolino et al. 1995, U.S. Fish and Wildlife Service 1991). A chamber is excavated and the carrion is buried. Eggs are deposited with the food source and, remarkable for insects, the female cares for the young (U.S. Fish and Wildlife Service 1991). Without an adequate source of food for the young, successful reproduction cannot take place. This species plays an important ecological role in nutrient recycling and decomposition.

Distribution and Status

Table H-2 summarizes species occurrence in the planning area. Entomologists have conducted surveys for the species in Nebraska and South Dakota, including surveys on the Ft. Pierre National Grassland and the Nebraska and Samuel R. McKelvie National Forests (Marrone 1993, Jameson and Ratcliffe 1995, Backlund and Marrone 1995). Observations of a few individual beetles are confirmed on the Nebraska National Forest near Halsey and on the nearby Valentine

National Wildlife Refuge (McDaniel 1992). The species to date has not been found on the Samuel R. McKelvie National Forest or on the Fort Pierre National Grassland.

This beetle was formerly distributed throughout temperate eastern North America and west as far as the Missouri River watershed in central Montana (U.S. Fish and Wildlife Service 1991). Its historic range has been reduced more than 90 percent and is currently limited to disjunct populations in Rhode Island, Oklahoma, Nebraska, Arkansas, and South Dakota (Ratcliff and Jameson 1992). Historically, documented distribution in South Dakota was limited to a few counties in the eastern part of the state and Haakon County. Recently (1995) live specimens were caught in Gregory, Tripp, and Todd counties in the southcentral portion of South Dakota (Douglas Backlund, pers. comm., cited in Black Hills National Forest LRMP Biological Assessment and Biological Evaluation). No known records, historical or contemporary, exist for Wyoming.

ESA Status and Other Organization Rankings

ESA - Endangered; TNC / NHP - G2; NE - Endangered.

Habitat

Existing populations inhabit a wide variety of habitats including maritime scrub plant communities in the Northeast; deciduous and coniferous communities on slopes and ridge-tops, deciduous riparian forest, and valley-bottom pastures in the South; and prairies with few trees in the Upper Midwest (U.S. Fish and Wildlife Service 1991). They have also been found in and near emergent vegetation around wetlands in the Nebraska Sandhills (Len McDaniel, pers. comm.). Their broad geographic range may indicate that vegetation structure and soil types are not constraining to the populations (U.S. Fish and Wildlife Service 1991). Common attributes identified in the Recovery Plan include level topography, well-drained soils, and a well-formed detritus layer (U.S. Fish and Wildlife Service 1991). Beetles found in South Dakota and Nebraska were associated with sandy soils, which conforms to other areas of the Midwest. Because comprehensive descriptions of suitable habitat and vegetation parameters are not available, it's not possible to quantify the amount of suitable habitat. Because of the limited number of observations and the incidental nature of these observations, it's also not possible to define the distribution of the species on the national forests.

Recovery and Conservation Planning

A Recovery Plan was approved in 1991. The plan recommends protection and management of occupied habitat, captive propagation, inventory for other populations, and the re-establishment of two additional self-sustaining populations (one in the west), with a minimum of 500 individuals per population.

Direct and Indirect Effects on NFS Lands

Two factors have been proposed as causal agents in the precipitous population declines in this species. The first factor is the reduction of the beetle's optimum size carrion, especially the young of passenger pigeons and greater prairie chickens. These may have been the most important carrion, but declines in the other birds and animals may have also contributed to the decline.

Cumulative Effects

Habitat fragmentation and increases in habitat edge on private and state lands in the Nebraska Sandhills may have resulted in increases in raccoon, skunk, and other scavenger populations, possibly resulting in reduced carrion for beetles.

Interrelated and Interdependent Actions

Unknown

Conservation Measures

The following conservation measures (see greater prairie chicken evaluation in this document for a detailed quantitative summary of these conservation measures) are presented as management direction in the revised LRMP (Alternative 3):

Unit-wide Direction (Chapter 1)

NNF (BRD) and SRMNF

- There are numerous standards and guidelines for enhancing prairie chicken and sharp-tailed grouse (optimum-sized carrion) populations and habitat and for protecting display grounds and nesting activities (see greater prairie chicken evaluation in this document for a detailed and quantitative summary of this direction).
- Restrict pesticide use where it would have adverse effects on the species (Standard).

Geographic Area Direction (Chapter 2)

NNF (BRD) and SRMNF

- There are numerous guidelines for enhancing prairie chicken and sharp-tailed grouse (optimum-sized carrion) populations and habitat (see greater prairie chicken evaluation in this document for a detailed and quantitative summary of this direction).

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

NNF (BRD) and SRMNF

- Continue surveys to further determine abundance and distribution.

Biological Determinations, Risk Assessments and Rationale

NNF (BRD)

Determination is "not likely to adversely affect." Beetles could be trampled by permitted livestock, recreational horses, and vehicles, but this is considered a "discountable effect." Population indices for the species are not available for these areas. However, given the enhancement of prairie chicken and sharp-tailed grouse habitat on these units, it's reasonable to conclude that the anticipated increases in long-term prairie grouse populations because of the enhanced habitat conditions should increase preferred carrion availability for the species. This is considered a possible "beneficial effect."

A risk outcome was not selected. It would be unreasonable to make such a prediction given the paucity of information about the species and its habitat.

SRMNF

Determination is "no effect." There are no known occurrences on this area.

Whooping Crane (Grus americana)

The recovery plan for this species (U.S. Fish and Wildlife Service 1994) and Lewis (1995) were two of the primary references consulted for information on this species.

Species Description

This is one of the rarest and largest North American birds. Whooping cranes are omnivorous feeders and seem to easily adjust to whatever suitable plant and animal foods they encounter during migration (EA Engineering, Science and Technology 1986, Armbruster 1990).

Distribution and Status

Table H-2 summarizes species occurrence in the planning area. Incidental use in the form of occasional foraging and roosting stops on or near several of the national grasslands is uncommon and has to be considered incidental. Whooping cranes occur as rare spring and fall migrants in the planning area. Spring migration through the planning area generally occurs sometime from late March through early May, while fall migration can be expected sometime from early September through the first week in November. Standard surveys for the species on NFS lands are not conducted since their occurrence is so sporadic and incidental. Forest Service maps of occurrence locations were consulted.

The population that migrates through portions of the planning area is known as the Aransas / Wood Buffalo population. These birds (approximately 120 in the population) winter in coastal Texas and nest in Canada (U.S. Fish and Wildlife Service 1994).

ESA Status and Other Organization Rankings

ESA - Endangered; TNC / NHP - G1, N1; MT, NE, SD - Endangered.

Habitat

Habitats used on or near NFS lands in the planning area by migrating whooping cranes include small ponds, upland grasslands, and rivers. The use is so rare and incidental that it was not possible to quantify the amount of potential and suitable habitat.

Recovery and Conservation Planning

The latest revision of the recovery plan for this species was approved in 1994. Critical habitat is designated at nine sites. However, none of the sites occur near any of the National Grasslands or Forests in the planning area.

Direct and Indirect Effects on NFS Lands

Whooping cranes could be exposed to grain-based rodenticides used for prairie dog poisoning if during migration they would land on national grasslands to forage or rest in areas where rodenticides were recently applied.

Fences and powerlines could also result in whooping crane mortality, but once again, due to the rare nature of whooping crane visits, this is considered a "discountable" effect or risk.

Cumulative Effects

The same direct and indirect effects described above may also occur on other landownership near NFS lands.

Whooping cranes can also be lost from collisions with structures such as powerlines and fences.

Wetland drainage and altered river flows (USDA Forest Service 2000, Johnson 1998, Sieg et al. 1999, Ostlie et al. 1997) have degraded and reduced whooping crane habitat.

Interrelated and Interdependent Actions

Unknown

Conservation Measures

Due to the rare, incidental and unpredictable nature of whooping cranes on these units, specific conservation measures are unwarranted. Observations of the species on the national grasslands and forests will be documented. The U.S. Fish and Wildlife Service will be consulted if whooping cranes are observed on the national grasslands or forests.

Biological Determinations, Risk Assessments, and Rationale

LMNG, GR/CRNG, BGNG, FPNG, NNF (BRD), SRMNF

Determination is "not likely to adversely affect." The likelihood of whooping cranes landing on the national grasslands and forests where rodenticides (grain baits) were recently applied is so remote that it is considered a "discountable effect." The reduced and limited amount of rodenticide use under Alternative 3 further supports the "discountable'' nature of this risk.

A risk outcome was not selected due to the rare and incidental use of the national grasslands and forests by migrating whooping cranes.

Bald Eagle (*Haliaeetus leucocephalus*)

The recovery plans for the bald eagle (U.S. Fish and Wildlife Service 1983, 1984), and the Federal Register rules to downlist and delist the species (U.S. Fish and Wildlife Service 1995 and 1999) were the primary references consulted for information on current status of the species. Gerrard (1983) was also consulted for additional information on status and population trend. Another primary reference for general life history and management needs was Green (1985).

Species Description

There are two subspecies of the bald eagle. In the planning area, the subspecies of concern is the northern bald eagle. This subspecies is thought to originate in the central provinces of Canada and in the Great Lakes states (Dinan 1983). Bald eagles are relatively long-lived birds that tend to return annually, as adults, to the same wintering areas. Although fish and waterfowl are common food sources, during winter they also hunt uplands for birds and mammals. They will also scavenge for many types of carrion.

Distribution and Status

Table H-2 summarizes species occurrence in the planning area. Bald eagles occur primarily as spring and fall migrants across the planning area. Successful nesting on or near NFS lands in the planning area was last recorded in 1975 along the Little Missouri River (Little Missouri National Grassland). Territorial pairs continue to be sighted on several of the National Grasslands, and recent nesting attempts have occurred on the Thunder Basin National Grassland. Numerous winter roost sites have been documented on the Thunder Basin National Grassland. Forest Service personnel and others conduct routine surveys for this species. Forest Service maps of occurrence locations were consulted during this assessment.

ESA Status and Other Organization Rankings

ESA - Threatened; TNC / NHP - G4, N4; NE, SD - Endangered

The bald eagle was downlisted to threatened in 1995 and proposed for delisting in 1999. To date, delisting has not occurred.

Habitat

Three elements are considered important for effective winter habitat: perches, roosts, and food. Bald eagles are commonly seen perched and roosting in trees along streams, rivers, lakes, and reservoirs. They are also seen in ponderosa pine forests within the planning area. Roost sites obviously need perches, and roosts are often located in areas protected from the wind by trees and / or terrain. Wintering eagles on and near NFS lands in the planning area are frequently observed feeding on carrion along roads and in areas where waterfowl concentrate. They are also commonly observed hunting over prairie dog colonies where it's presumed they are hunting for prairie dogs, other prey species, or carrion.

Recovery and Conservation Planning

Nebraska, South Dakota, and North Dakota are included in the Northern States Bald Eagle Recovery Zone; Wyoming is in the Pacific States Bald Eagle Recovery Zone. Recovery plans for the northern states and Pacific states recovery zones were prepared in 1983 and 1984, respectively. Although critical habitat has been designated, none of the areas is on or near NFS lands within the planning area. The general goals for delisting the species is 1,200 and 800 occupied breeding territories in the Northern States and Pacific recovery zones, respectively. Delisting goals have already been met for the Northern States recovery zone and mostly met in the Pacific recovery zone (U.S. Fish and Wildlife Service 1995 and 1999).

Direct and Indirect Effects on NFS Lands

Roosting and future potential nesting habitat in deciduous forests along streams and rivers can decline if livestock grazing practices prevent tree regeneration and/or accelerate tree declines already occurring.

Reductions in prairie dog populations by poisoning may reduce winter feeding areas for bald eagles. Secondary poisoning risks from prairie dog poisoning are unlikely (Tietjen 1976).

Power line electrocution can cause eagle mortality.

Oil and gas exploration and development and recreation activities can disturb wintering and nesting bald eagles (Joslin and Youmans 1999).

Coal production can result in the loss of occupied and potential bald eagle habitat. Under Alternative 3, 47,990 acres are designated for mineral production and development (MA 8.4) on the Thunder Basin National Grassland. Coal production and reclamation is regulated by other state and federal agencies. The Office of Surface Mining is the federal agency with responsibility for approving mining plans. The state of Wyoming has delegated primacy for approval of mining and reclamation plans to the Wyoming Department of Environmental Quality. Forest Service reviews mining and reclamation plans to determine compliance with LRMP direction. Mining and reclamation plans also require consultation with the U.S. Fish and Wildlife Service.

Cumulative Effects

Reductions in the threats to the species across its range, such as DDT pesticides, have obviously reversed the population declines that resulted in its ESA listing (Ostlie et al. 1997). The recent downlisting from endangered to threatened is indicative of positive changes across the range of the species. An increasing number of nests and nesting attempts in the northern Great Plains planning area are also indicative of positive trends.

Alteration of hydrologic flows due to irrigation and hydroelectric dams along major rivers in the planning area (Johnson 1998, Ostlie et al. 1997) has reduced periodic scouring needed downstream for establishment of cottonwood seedlings. This can result in a gradual decline of cottonwood stands used for nesting.

Development of large irrigation and hydroelectric dams has created new waterfowl concentration areas that are favorite hunting areas for bald eagles.

Management for waterfowl production on the nearby national wildlife refuges increases prey and carrion availability for bald eagles.

Oil and gas exploration and development and recreation activities on public domain lands can also affect bald eagles and their habitat. The Bureau of Land Management also uses oil and gas stipulations to protect and conserve bald eagles and their habitats.

Depending on the final selected route, the new proposed railroad (Powder River Basin Expansion Project) corridor could degrade eagle habitat along the Cheyenne River on the Buffalo Gap National Grassland.

New 230 and 340 KV powerlines proposed across the Thunder Basin National Grassland could increase mortality risks to bald eagles.

Interrelated and Interdependent Actions

Oil and gas exploration and development activities, unless carefully managed, can disturb and displace bald eagles, causing reduced reproductive success, nest abandonment or reduced use or abandonment of winter roosting areas (Romin and Muck 1999, Richardson and Miller 1997, Lerczak 1992, Joslin and Youmans 1999). Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development. Although the decision to make areas available for oil and gas leasing does not result in on-the-ground activities and possible effects on bald eagles, oil and gas stipulations to protect and conserve bald eagles and their habitat are needed at the time leasing availability decisions are made. Site-specific biological assessments and evaluations are also conducted at the time applications to permit drilling are considered by the Forest Service. The number of new wells predicted in the reasonable and foreseeable development analysis for the national grasslands with moderate to high oil and gas potential is as follows:

	Oil and Gas Wells	Coalbed Methane Wells
LMNG	600	60
CRNG		
BGNG	85	0
ONG	15	0
TBNG	140-230	600

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. Unless carefully managed, livestock grazing can cause deterioration and eventual loss of riparian habitats. It can also result in requests to control prairie dog populations on NFS lands.

Conservation Measures

The following conservation measures are presented as management direction in the revised LRMPs (Alternative 3):

Unit-wide Direction (Chapter 1)

All National Grasslands and Forests

- Protect nests and winter roost sites from disturbances or habitat destruction (Standards, Guidelines).
- Prohibit development of new facilities within 1 mile of bald eagle nests and winter roosts (Standard).
- Prohibit or limit activities causing disturbances to bald eagles within 1 mile of nests from 2/1 to 7/31 and from 11/1 to 3/31 within 1 mile of a winter roosting area. (Standard, Guideline)
- Avoid projects that would reduce water flows to levels that would threaten the integrity and health of riparian systems (Standards).
- Emphasize regeneration and health of riparian habitats (includes cottonwood riparian). (Objective, Standards, Guidelines)
- Bury new electric (< 33 KV) and telephone lines (Guideline).

All National Grasslands and Forests, cont.

- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

FPNG, BGNG, ONG, TBNG, NNF (BRD), SRMNF

- Require new aboveground utility lines to have 80-inch spacings between conductors and ground-wires. Modify existing lines or install perch-inhibitors when special use permits are reissued (Standard).

All National Grasslands Except SNG

- Expand prairie dog populations (see black-tailed prairie dog evaluation in this document for a detailed and quantitative summary of this direction). (Standards and Guidelines)

Geographic Area Direction (Chapter 2)

All National Grasslands Except SNG

- Expand prairie dog populations (see black-tailed prairie dog evaluation in this document for a detailed and quantitative summary of this direction). (Guidelines)

All National Grasslands and Forests

- The objectives to provide a diverse mosaic of seral stage and structure grasslands on these areas are summarized in Table H-5 and H-6 in Section 5 of this document and this should enhance prey base.

Management Area Direction (Chapter 3)

TBNG

- Cheyenne River Zoological Special Interest Area (MA 2.1b) is established with standards to expand prairie dog populations; reduce disturbances from management activities and other land uses; and ensure regeneration of the cottonwood and willow gallery forests along the river. This area is 5,980 acres in size (see MA 2.1b in the revised LRMP for details of management direction).

Monitoring Direction (Chapter 4)

All National Grasslands and Forests

- Continue surveys to further determine status of breeding and wintering eagles.
- If bald eagle nesting occurs in the future on these lands, monitor the effectiveness of oil and gas stipulations for this species.
- Monitor the effectiveness of oil and gas stipulations in protecting winter roosting areas.

Appendices

All National Grasslands and Forests

- Apply oil and gas stipulations (Appendix D in revised LRMPs) to protect nests and winter roosts. Scientific references to support the oil and gas stipulations for bald eagle nests and winter roosting areas include Lerczak (1992) and Romin and Muck (1999).

Biological Determinations, Risk Assessments, and Rationale

All National Grasslands and Forests

Determination is "not likely to adversely affect." Outcome II is selected as the risk assessment. Management to emphasize regeneration on at least 80% of the riparian habitat will slow, prevent, or possibly reverse the decline of roosting and potential nesting habitat associated with gallery forests. This is especially important for cottonwood floodplains, which are used for roosting and perching. Expansion of prairie dog populations may also enhance foraging habitats and prey base for migrating and wintering bald eagles. These actions contribute to a higher level of probability that regional bald eagle populations will be viable over the long-term and are considered benefical effects. This prediction seems reasonable given the apparent increases in number of eagles using these areas and the increasing number of eagle pairs and nesting attempts within the planning area. Also, regional trends for the number of bald eagles and breeding territories continue to increase (Green 1985, Gerrard 1983, Swenson 1983, U.S. Fish and Wildlife Service 1995 and 1999), as does the number of nesting attempts. However, the potential impacts (reduced channel scouring) of large dams like the Angostura irrigation project on the Cheyenne River in South Dakota on downstream hydrology and cottonwood regeneration may be problematic. It is possible that potential nesting and winter roosting habitat for some distance below this dam may be on a long-term decline and improved grazing management in these areas on national grasslands and private lands may only slow the rate of decline. It's acknowledged that negative effects of large reservoirs on downstream cottonwood regeneration and potential future nesting habitat may be partially offset by positive impacts such as enhanced winter food availability (fish and waterfowl) as a result of the reservoirs.

Black-footed Ferret (*Mustela nigripes*)

Anderson et al. (1986), Clark (1989), Biggins and Godbey (1995), Joslin and Youmans (1999), U.S. Fish and Wildlife Service et al. (1994) and the national recovery plan (U.S. Fish and Wildlife Service 1988) were consulted as primary references for background information on this species.

Species Description

The black-footed ferret is a medium-sized carnivore and the only ferret native to North America. Black-footed ferrets are primarily nocturnal and live almost exclusively in prairie dog colonies. Prairie dogs are their primary prey. Ferrets mate in April or May and have 1 litter per year, typically of 3 to 5 young. The species is active all year and do not hibernate.

Distribution and Status

Table H-2 summarizes species occurrence in the planning area. Black-footed ferret surveys have been conducted on all NFS lands where prairie dog poisoning has occurred in the past. Many of these surveys were initiated in the 1970s and were conducted to varying degrees of standardization and intensity until the early 1990s. Although occasional ferret-like sign was observed on the various NFS units, wild ferrets were never found and confirmed by Forest Service or U.S. Fish and Wildlife Service biologists on or near these lands. An exception to this is a sighting by a biologist near the Buffalo Gap National Grassland but that sighting remains questionable, although the U.S. Fish and Wildlife Service lists it as a confirmed sighting. It is believed the last unquestionable historical record of a wild ferret occurred near the Buffalo Gap National Grassland in 1965 and involved a roadkill near Cottonwood, South Dakota. It is

believed that all ferrets on NFS lands in the planning area today are the result of an ongoing reintroduction program on the Buffalo Gap National Grassland and adjoining Badlands National Park (U.S. Fish and Wildlife Service et al. 1994). During surveys in the summer and fall of 2,000, 89 adults and 58 wild-born litters totaling 140 kits were observed in the reintroduction habitat. The most recent ferret locations in the reintroduction area were consulted in this evaluation and are maintained in the administrative record.

All other known ferret populations in the wild are also the result of reintroduction programs. Other reintroduced populations are located in Montana, Wyoming, Arizona, and in a new site along the border of Colorado, Utah, and Wyoming.

ESA Status and Other Organization Rankings

ESA - Endangered; TNC / NHP - G1, N1; MT, NE, SD - Endangered

Habitat

Prairie dogs and their colonies are the habitat of black-footed ferrets, and ferret movements off prairie dog colonies represent dispersal to find other prairie dog colonies. Based on the most recent information on habitat use by ferrets in the Conata Basin / Badlands reintroduction area (William Perry and Travis Livieri, personal communication), prairie dog colony complexes of 1,000 to 1,800 acres may be sufficient to support the minimum adult population of 30 as specified in the recovery plan for reintroduction areas. However, the authors of the recovery plan and others studying black-footed ferrets (Biggins and Godbey 1995, Bevers et al. 1997) have suggested the need for much larger colony complexes to increase the probability of long-term persistence of ferret populations.

Various authors have provided estimates of minimum viable populations (MVP). Frankel and Soule' (1981) provided a general rule that at least 50 adults are needed to maintain short-term (30 generations) genetic fitness. Groves and Clark (1986), using data from the Meeteetse ferret population, suggested that a MVP of 214 breeding adult ferrets would be needed to maintain an effective population of 50 adults. Using the area requirements of ferrets in the Conata Basin / Badlands reintroduction area, a minimum complex size of 7,490 to 12,840 acres would be needed to support 214 adult ferrets. Harris et al. (1989) used demographic data from both South Dakota and Wyoming ferret populations in a computer simulation model and suggested that 90 to 100 ferrets would have a 95% probability of surviving 50 to 100 years.

The total acreage of active prairie dog colonies on each National Grassland and Forest at the time of the last surveys (1996-1998) is as follows:

- GR / CRNG - 1,520.
- LMNG - 2,860.
- TBNG - 18,340.
- ONG – 740.
- BGNG - 13,280.
- FPNG – 720.
- NNF (BRD) – 70.

These acreages include fully and partially active colonies but do not include colonies that were inactive at the time of the last survey. Prairie dog populations on all or most of the national grasslands and forests listed above have likely increased since the last surveys.

Recovery and Conservation Planning

The latest recovery plan was approved in 1988 (U.S. Fish and Wildlife Service 1988), and the recovery objective is to ensure the immediate survival of the species by accomplishing the following:

- Increasing the captive population of black-footed ferrets to a census size of 200 breeding adults by 1991.
- Establishing a prebreeding census population of 1,500 free-ranging black-footed ferret breeding adults in 10 or more populations, with no fewer than 30 breeding adults in any population by the year 2010.
- Encourage the widest possible distribution of reintroduced black-footed ferret populations.

An environmental impact statement for black-footed ferret reintroduction in the Badlands National Park and Conata Basin portion of the Buffalo Gap National Grassland was issued in 1994 (U.S. Fish and Wildlife Service et al. 1994).

Direct and Indirect Effects on NFS Lands

Prairie dog poisoning obviously reduces prey availability for black-footed ferrets. Repeated poisoning also reduces burrow availability for shelter. Primary and secondary poisoning of ferrets from consuming poisoned prairie dogs or bait are not considered significant threats. Use of burrow fumigants pose a direct threat to individual ferrets. Under the direction for rodenticide use and prairie dog management in Alternative 3, the total acreage of active prairie dog colonies will be expected to increase on each national grassland and forest over the next 10 years to the levels presented below. The lower end of the range is predicted if favorable precipitation and grassland production conditions prevail over the next 10 years, and the upper end of the range is predicted if drought conditions are common during the period. These acreages of active prairie dog colonies occur both in and outside (dispersal habitat) black-footed ferret reintroduction habitat areas.

- GR/CRNG – 2,500 to 3,900.
- LMNG – 5,400 to 9,400.
- TBNG – 30,000 to 47,000.
- ONG – 1,200 to 1,900.
- BGNG – 22,000 to 36,000.
- FPNG – 1,200 to 1,900.
- NNF (BRD) - unknown.

Establishment of black-footed ferret reintroduction habitat on national grasslands will make significant contributions to help meet the national recovery objectives for the species.

Currently, there is limited data from controlled experiments that document significant reductions in prairie dog populations due to recreational shooting (Knowles 1987, Vosburgh and Irby 1998). Accidental ferret mortality associated with prairie dog shooting is possible (Joslin and Youmans 1999).

Livestock grazing can be used to either help contain or increase prairie dog colony acreages, which in turn affects habitat availability and suitability for ferrets.

Intense development and activity associated with recreation and oil, gas, and mineral development could result in direct and indirect negative effects (Joslin and Youmans 1999). Well pads and oil and gas access roads reduce the amount of suitable ferret habitat. Increased vehicle travel due to oil and gas activities may also increase mortality risks to black-footed ferrets.

Coal production can result in the loss of black-footed ferret habitat. Under Alternative 3, 47,990 acres are designated for mineral production and development (MA 8.4) on the Thunder Basin National Grassland. Coal production and reclamation is regulated by other state and federal agencies. The Office of Surface Mining is the federal agency with responsibility for approving mining plans. The state of Wyoming has delegated primacy for approval of mining and reclamation plans to the Wyoming Department of Environmental Quality. Forest Service reviews mining and reclamation plans to determine compliance with LRMP direction. Mining and reclamation plans also require consultation with the U.S. Fish and Wildlife Service.

Cumulative Effects

It is likely that reductions in prairie dog populations on private lands through poisoning will continue, thereby resulting in further losses of ferret habitat. Reductions from estimates of historic prairie dog colony acreages in the states within the planning area range from 75% to 90% (Mulhern and Knowles 1997). Additional reductions of prairie dog colonies on adjoining and nearby Indian Reservations could also occur in the future.

Lands previously owned by The Nature Conservancy have been added to the Cheyenne River ferret reintroduction habitat on the Thunder Basin National Grassland. Other opportunities to cooperate with tribal organizations in black-footed ferret recovery probably also exist, but additional coordination is needed to ascertain the likelihood of future cooperative projects with adjoining Indian reservations to enhance black-footed ferret recovery opportunities.

Oil and gas exploration and development on public domain lands could also have impacts on black-footed ferrets and their habitat. The Bureau of Land Management has oil and gas stipulations that require ferret surveys and consultation with U.S. Fish and Wildlife Service if ferrets are observed.

Prairie dog poisoning on public domain lands, National Wildlife Refuges and National Parks could reduce the amount of potential black-footed ferret habitat. However, poisoning on federal lands by these agencies is either no longer occurring or has been limited only to situations involving human health or safety concerns.

Construction of the new proposed railroad tracks (Powder River Basin Expansion Project) and train traffic along this new transportation corridor could result in some habitat loss and additional mortality risks to ferrets on the Thunder Basin and Buffalo Gap National Grasslands.

Plague epizootics in prairie dog colonies could reduce and further fragment black-footed ferret habitat.

Interrelated and Interdependent Actions

Oil and gas exploration and development activities, unless carefully managed, can result in habitat loss, risks, and adverse disturbances to black-footed ferrets (U.S. Fish and Wildlife Service 1990). Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development. Although the decision to make areas available for oil and gas leasing does not result in on-the-ground activities and possible effects on black-footed ferrets, oil and gas stipulations to protect and conserve ferrets and their habitat are needed at the time leasing availability decisions are made. Site-specific biological assessments and evaluations are also conducted at the time applications to permit drilling are considered by the Forest Service. The number of new wells predicted in the reasonable and foreseeable development analysis for the national grasslands with moderate to high oil and gas potential is as follows:

	Oil and Gas Wells	Coalbed Methane Wells
LMNG	600	60
BGNG	85	0
TBNG	140-230	600

The reintroduction habitat allocated on the Buffalo Gap National Grassland is located outside the areas with moderate or high oil and gas production potential. However, the potential ferret habitat on the Little Missouri and Thunder Basin National Grasslands is located in nationally significant oil and gas production areas. Approximately 63%(32,500 acres) of the reintroduction habitat area on the Thunder Basin National Grassland is currently leased, and of that amount, approximately 35% (11,500) is held by production.

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. Livestock grazing permittees commonly request prairie dog poisoning on NFS lands to reduce forage consumption and clipping by prairie dogs.

Conservation Measures

The following conservation measures are presented as management direction in the revised LRMPs (Alternative 3):

Unit-wide Direction (Chapter 1)

LMNG, GRNG, FPNG, BGNG, ONG, TBNG

- Limit and restrict activities and land uses in prairie dog colonies that are occupied or thought to be occupied by black-footed ferrets to reduce disturbances. This protection extends from March 1 through August 31 and to the immediate expansion zone (1/8 mile) of these colonies (Standards, Guidelines).
- Expand prairie dog populations through reduced use of rodenticides, livestock grazing management, landownership adjustments, and if needed, restrictions on prairie dog shootng (Standards, Guidelines).
- Manage for no net loss of suitable black-footed ferret habitat due to management activities and land uses. This is based on the amount of suitable habitat available when the activity or land use is proposed (Standard).

LMNG, GRNG, FPNG, BGNG, ONG, TBNG, cont.

- Limit oil and gas development to 1 well per 80 acres of occupied ferret habitat (Standard).
- Align new roads outside prairie dog colonies or minimize roads within colonies (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat, including prairie dog colonies, for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

LMNG, GRNG, FPNG, BGNG, ONG, TBNG

- Expand prairie dog populations (Guidelines).
- Establish new prairie dog colony complexes (Guidelines). New complexes that may serve as black-footed ferret reintroduction habitat 15 or more years in the future are prescribed for the following areas:
- LMNG (2 new complexes plus southerly expansion of Horse Creek complex),
- GRNG (southern half of Grand River National Grassland),
- FPNG (Sand and Timber Creek drainages),
- ONG.

Management Area Direction (Chapter 3)

LMNG, BGNG, TBNG

- One expanded and three new black-footed ferret reintroduction habitat areas (MA 3.63) are established. Standards are provided to expand prairie dog populations and reduce disturbances and risks to ferrets from management activities and other land uses. The size of these areas and the amount of black-footed ferret habitat in each one are as follows:

Area (MA 3.63)	NFS Acres	Current Prairie Dog Colony Acreage	Predicted Prairie Dog Colony Acreage in 10 Years
Horse Creek (LMNG)	29,180	300	1,200 to 2,800
Conata Basin / Badlands (BGNG)	78,720	10,890	17,800 to 28,200
Smithwick (BGNG)	25,310	300	1,200 to 2,800
Cheyenne River (TBNG)	53,830	12,430	20,300 to 32,200

- The predicted prairie dog colony acreages in 10 years for each area, the low end of the range is predicted if precipitation patterns are generally favorable for vegetative growth over the next 10 years, and the high end of the range is predicted if drought conditions and favorable colony expansion conditions extend through much of the period.
- Apply oil and gas stipulations (Appendix D in revised LRMPs) for black-footed ferrets to all prairie dog colonies in black-footed ferret reintroduction habitat (MA 3.63) (Standard).
- Limit oil and gas development to 1 well per 80 acres in all prairie dog colonies in black-footed reintroduction habitat (MA 3.63) (Standard).

- Prohibit prairie dog shooting in black-footed ferret reintroduction habitat (MA 3.63) (Standard).
- Only use rodenticides to reduce prairie dog populations in black-footed ferret reintroduction habitat (MA 3.63) after consultation and concurrence with U.S. Fish and Wildlife Service (Standard).
- As needed and in consultation with appropriate state and federal agencies, establish new prairie dog colonies in black-footed ferret reintroduction habitat (MA 3.63) through prairie dog relocation (Standard).

Monitoring Direction (Chapter 4)

LMNG, GRNG, FPNG, BGNG, ONG, TBNG

- Continue monitoring populations (in MA 3.63) and habitat.
- Monitor effectiveness of landownership adjustments and cooperative agreements in reducing private land conflicts and enhancing long-term opportunities for prairie dog habitat expansion.
- Monitor effectiveness of oil and gas stipulations in protecting this species and its habitat.

Appendices

LMNG, BGNG, TBNG

- Appy oil and gas stipulations (Appendix D in revised LRMPs) for black-footed ferrets to all prairie dog colonies in black-footed ferret reintroduction habitat (MA 3.63) and to only those colonies outside MA 3.63 that are occupied or thought to be occupied by black-footed ferrets. The primary reference to support the oil and gas stipulations for black-footed ferrets and their habitat is U.S. Fish and Wildlife Service (1990).

Biological Determinations, Risk Assessments, and Rationale

LMNG

Determination is "not likely to adversely affect." It is highly unlikely that wild ferrets occur in this area. However, the Horse Creek area is made available as black-footed ferret reintroduction habitat, and active management will be used to accelerate prairie dog expansion. It's likely that sufficient habitat will be available for reintroductions and to support at least 30 adult ferrets in this area within the next 10 to 15 years. However, growth of the colony complex would need to continue beyond the next 10 to 15 years to increase the likelihood of long-term viability for the ferret population in the Horse Creek area. If the management efforts to develop new complexes are successful, additional reintroduction habitat may be available in the future.

GR/CRNG

Determination is "not likely to adversely affect." It is highly unlikely that wild ferrets occur in this area. However, if management efforts to develop one or more new complexes in the south half of the national grassland are successful, new reintroduction habitat may be available here in 15 or more years.

FPNG

Determination is “not likely to adversely affect.” It is highly unlikely that wild ferrets occur in this area. However, if management efforts to develop a new complex in the northeast part of this national grassland are successful, new reintroduction habitat may be available here in 15 or more years.

BGNG

Determination is "not likely to adversely affect" for those areas on this national grassland outside the Conata Basin/Badlands experimental population area (U.S. Fish and Wildlife Service et al. 1994). New reintroduction habitat on the Buffalo Gap National Grassland is allocated in the Smithwick, South Dakota area. It’s likely that sufficient habitat will be available for reintroductions and to support at least 30 adult ferrets in this area within the next 10 to 15 years. However, growth of the colony complex will need to continue beyond the next 10 to 15 years to increase the likelihood of long-term viability for a ferret population in this area.

Determination is "not likely to jeopardize a proposed species" for those areas on this national grassland within the Conata Basin/Badlands experimental population area (U.S. Fish and Wildlife Service et al. 1994). Under Alternative 3, the Conata Basin/Badlands Black-footed Ferret Reintroduction Habitat Area is substantially expanded. This is a beneficial effect. Estimated current and 10-year ferret carrying capacities for ferrets in this area, including the habitat on the Badlands National Park, as determined using 2 different modeling approaches are 191 to 438 and 236 to 540 ferret families, respectively (Northern Great Plains Terrestrial Assessment). These projections did not include capacity provided by dispersal habitat located outside the reintroduction area but within the experimental population area. These projections demonstrate that both current and projected carrying capacities for this reintroduction area exceed the viability probabilities of a 50 to 100 year survival period for 90 to 100 ferrets reported by Harris et al. (1989). Allocation of the expanded Conata Basin/Badlands reintroduction represents a significant contribution to the national recovery program, especially when considering that this area appears to be at low risk of plague epizootic.

Outcomes III and V are selected as the risk assessment for this species on the Buffalo Gap National Grassland. The rationale for Outcome III is that the black-footed ferret habitat remains fragmented with significant gaps of suitable habitat for successful dispersal, but the focus to develop the nearby Smithwick ferret habitat area will reduce the level of fragmentation. Also, the observations of 58 wild-born litters (140 kits) during the summer and fall of 2,000 certainly demonstrate at least short-term success of ferret reintroductions in the Conata Basin/Badlands area. Outcome V is selected as the most appropriate risk assessment if plague should become problematic in this area in the future.

ONG

Determination is “not likely to adversely affect.” It is highly unlikely that wild ferrets occur in this area. If management efforts to develop a new prairie dog complex on this national grassland are successful, the additional suitable habitat for ferret dispersal would certainly complement the ferret reintroduction habitat on the adjoining Buffalo Gap National Grassland.

TBNG

Determination is “not likely to adversely affect.” It is highly unlikely that wild ferrets occur in this area. Direction under Alternative 3 allocates an expanded reintroduction habitat area. Estimated current and 5-year ferret carrying capacities for ferrets in this area as determined using 2 different modeling approaches are 162 to 208 (Biggins et al. 1993) and 158 to 204 (U.S. Fish and Wildlife Service et al. 1994) ferret families, respectively. These projections did not include capacity provided by dispersal habitat located outside the reintroduction area. These projections demonstrate that both current and projected carrying capacities for this reintroduction area exceed the viability probabilities of a 50 to 100 year survival period for 90 to 100 ferrets reported by Harris et al. (1989).

Allocation of this area as black-footed ferret reintroduction habitat represents a significant contribution to the national recovery program, assuming that plague does not decimate prairie dog populations in the future. A recent, nearby plague epizootic suggests that plague may be problematic in this area in the future.

NNF (BRD)

Determination is "no effect." It is highly unlikely that black-footed ferrets occur in these small isolated colonies in the Nebraska Sandhills, and it is highly unlikely that the area supports any potential ferret habitat. This part of the Sandhills is not capable of supporting large prairie dog colony acreages because of steep and rough topography and the capability to grow tall and dense vegetation. It appears that the area may not be able to support viable long-term prairie dog populations.

Mountain Plover (*Charadrius montanus*)

The following were key references consulted for this evaluation:

- The proposed rule to list the mountain plover as a threatened species (February 16, 1999 Federal Register Volume 64, Number 30, Pages 7587-7601).
- Information on the Northern Prairie Wildlife Research Center website (Johnson and Igl 2000 and Dechant et al. 2000).
- A mountain plover fact sheet on a U.S. Fish and Wildlife Service website (www.r6.fws.gov).
- Knopf (1996).
- USDA Forest Service (1994).

Species Description

The mountain plover is a medium-sized, ground-nesting bird of the uplands. It looks much like a small, pale version of the more common killdeer, but without chest stripes. The nest is a shallow depression in the ground containing three well-camouflaged eggs. Incubation lasts 29 days. The species feeds primarily on insects, especially spiders, beetles, grasshoppers, and other invertebrates.

Generally, mountain plovers arrive on the breeding grounds from mid-March to mid-April, and depart for fall migration in early August to late October (Graul 1973, 1975; Wallis and Wershler 1981; Olson 1984; Leachman and Osmundson 1990; Knopf 1996 *a, b*).

If the first nest fails before June, the female may attempt to renest (Knopf 1996*b*). Multiple nesting (the male incubates a first clutch while the female incubates a second clutch simultaneously) has been reported (Graul 1973, Knopf 1996*a*). Mountain Plovers exhibit fidelity to nest sites used the previous year (Graul 1973, 1975).

These are gregarious birds outside the breeding season. They forage and roost in loose flocks of changing composition. Flock size may exceed 1000 on southern Great Plains in late summer. Density at Charles M. Russell National Wildlife Refuge, Montana, was 16 breeding plovers per 247 acres (100 ha) in prairie dog towns and 1.7 birds per square mile (0.28 per sq. km.) in the entire area (Olson 1984). The brood usually moves 0.6 to 1.2 miles (one to two km.) from the nest site in the first two to three days (Knopf and Rupert 1996). More than half of the clutches are lost to predators, mainly coyote and swift fox. Chicks also experience high rates of predation (Knopf 1996).

Distribution and Status

Table H-2 summarizes species occurrence in the planning area. Surveys for the species on NFS lands by Forest Service biologists have been conducted on the Oglala, Thunder Basin, and Little Missouri National Grasslands. The species is believed to currently occur only on the Thunder Basin National Grassland. There are about 14,000 acres of nesting habitat identified on the national grassland, and it is estimated that 30 or more nests occur on this area annually. It is also estimated that 150 or more adults and fledglings use the national grassland annually. There appears to be suitable habitat on the national grassland that is currently not being used. Maps of the current nesting habitat and nesting sites on the national grassland maintained by the Forest Service were consulted for this evaluation. On the Oglala and Buffalo Gap National Grasslands, prairie dog colonies are assumed to be suitable but unoccupied habitat.

The former distribution of mountain plovers on the northern Great Plains included eastern and central Montana and sites throughout Wyoming. There are only a few records of mountain plover in North Dakota (Roosevelt 1885, Stewart 1975, Berkey et al. 1994), and the species was formerly a rare breeder in western South Dakota. The most recent sighting in South Dakota was in 1977 (South Dakota Ornithologists' Union 1991). Some birds have been recorded recently in western Nebraska.

A status survey (Leachman and Knopf 1991) indicated recent population declines rangewide of 50-89%. Breeding Bird Survey data show an average annual 3.7% decline between 1966 and 1993 (Knopf 1996). Population analysis for the period 1966 through 1996 showed a population decline of 2.7% annually (Commission on Environmental Cooperation 2000). The breeding distribution has also contracted, with both peripheral populations disappearing and core populations going from widely distributed to only locally present (Knopf 1996).

Mountain plovers breed from southeastern Alberta and southwestern Saskatchewan through central Montana, south to southcentral Wyoming, east-central Colorado and northeastern New Mexico, and east to northern Texas and western Kansas (National Geographic Society 1987).

The species breeds almost exclusively on the dry tablelands of the western Great Plains and Colorado Plateau, and winters mostly in California, southern Texas and Arizona, and in Mexico. Adults and fledglings leave the breeding grounds by early August. An additional small population resides yearlong in the Davis Mountains of western Texas (Knopf 1996). Current estimated populations are estimated between 8,000 to 10,000 birds.

ESA Status and Other Organization Rankings

ESA = Proposed; TNC / NHP G2; FS – Sensitive (R1 and R2)

The mountain plover has been proposed for listing as threatened under the Endangered Species.

The Committee on Environmental Cooperation, established under the North American Free Trade Act has identified the mountain plover as well as the black-tailed prairie dog as priority grassland species for conservation action.

Habitat

Mountain plover prefer large, flat grassland expanses with sparse, short vegetation, and bare ground (Giezentanner 1970; Graul 1973, 1975; Knowles et al. 1982; Olson 1984; Olson and Edge 1985; Shackford 1987; Wershler and Wallis 1987; Leachman and Osmundson 1990; Parrish et al. 1993; Knopf and Miller 1994; Knowles 1996). Areas disturbed by prairie dogs, heavy grazing, or fire can provide suitable habitat (Finzel 1964, Wallis and Wershler 1981, Knowles and Knowles 1984, Olson 1984, Shackford 1987, Wershler and Wallis 1987). Burning can benefit mountain plover when used to maintain areas of shorter grass within mixed grassland (Wallis and Wershler 1981, Knopf 1996*b*). In the short-grass prairie, mountain plover are attracted to prescribed burns (Svingen and Giesen 1999).

Mountain plover often are associated with blue grama or buffalo grass (Bradbury 1918; Laun 1957; Finzel 1964; Giezentanner 1970; Graul 1973, 1975; Graul and Webster 1976; Wallis and Wershler 1981, Parrish 1988, Parrish et al. 1993). The species often nests near cow pies, rocks, or clumps of vegetation (Graul 1975, Wallis and Wershler 1981, Olson and Edge 1985, Knopf and Miller 1994, Knopf 1996*a*, Parrish 1988, Parrish et al. 1993). Litter cover near nests in Montana was greater than that in the surrounding habitat (Olson 1984, Olson and Edge 1985).

On a northern Montana shrub-grassland, cattle grazing alone, without prairie dog towns, did not provide suitable habitat (Olson and Edge 1985). Mountain plover have been reported following sheep herds, inhabiting areas around stock tanks, and increasing in numbers where American bison are pastured (Knowles 1996). In Alberta, heavy grazing in summer or late winter improved habitat for mountain plover by providing short grass in mixed-grass areas (Wallis and Wershler 1981, Wershler and Wallis 1987). In Colorado, shortgrass pastures grazed heavily in summer were used for foraging and nesting (Giezentanner 1970). However, mountain plover may be excluded by extreme or long-term overgrazing (Laun 1957, Wallis and Wershler 1981).

In Montana, mountain plover were rarely seen outside of prairie dog colonies, and colonies smaller than 25 acres were considered marginal habitat (Knowles et al. 1982, Knowles 1996, Olson 1984). In Colorado, minimum area needed per brood was at least 69 acres, with brooding areas often overlapping (Graul 1973, Knopf and Rupert 1996). Three males defended territories averaging 40 acres. Prairie dog colonies also may provide greater food resources and more vulnerable prey for mountain plover (Olson 1985). Colonies occupied by mountain plover often are associated with cattle pastures and stock ponds (Knowles et al. 1982, Olson and Edge 1985). Within prairie dog colonies, mountain plover chose nest sites with shorter vegetation, more bare ground, and higher forb density (Olson 1984, Olson and Edge 1985). Prairie dogs within shrub-grassland pastures can control sagebrush growth and provide suitable nesting habitat (Olson 1984, Olson and Edge 1985).

Nests have been documented on high plains shortgrass prairie, desert tablelands, prairie dog colonies, and sagebrush / blue grama habitats. In central and southwestern Montana, southeastern Wyoming, and northeastern Colorado, nesting often occurs in shortgrass prairie with a history of heavy grazing or in low shrub semi-deserts. Nesting areas are characterized by very short vegetation, significant areas of bare ground (typically >30%), and flat or gentle slopes (< 12%) (Graul 1975, Graul and Webster 1976, Knowles et al. 1982, Olson 1984, Olson and Edge 1985, Olson-Edge and Edge 1987, Knopf and Miller 1994, Knopf 1996). Nesting can also occur in barren fields that subsequently are planted with millet or sunflowers, resulting in losses of eggs and chicks (Knopf 1996). Nests are on the ground in shallow depressions that may be lined with plant material and / or adjacent to dried cattle dung (Knopf and Miller 1994). Adults often take chicks to windmill / water tank areas to forage (Knopf 1996), but site around tank must be dry. The species generally avoids moist soils.

In areas where mountain plover are associated with prairie dog towns, the size of towns is an important factor. Mountain plover in Montana occurred at highest densities on towns 15-124 acres (6-50 ha) and were less abundant on smaller towns (Knowles et al. 1982, Olson 1984, Olson-Edge and Edge 1987). Average size of towns used by mountain plover in northcentral Montana was 142 acres (57.5 ha) (Knowles and Knowles 1984).

There's currently over 14,000 acres of occupied mountain plover habitat identified on the Thunder Basin National Grassland. Almost all of this is on prairie dog colonies. No attempt has been made yet to define and map potential and suitable habitat.

Current sizes of prairie dog colonies on the Thunder Basin, Buffalo Gap and Oglala National Grasslands are presented in this biological assessment in the black-footed ferret evaluation. The colony acreages in the table represent area on national grasslands only, and in some cases, an additional unknown acreage extends onto adjoining private or state lands.

Using the habitat use information from Colorado on habitat use by broods (Graul 1973, Knopf and Rupert 1996), 82 colonies on the Thunder Basin National Grassland could potentially support at least one brood. At least 65 colonies could support a minimum of one breeding territory. These statistics will continue to look more favorable for the mountain plover as prairie dog populations expand under the revised LRMP.

Recovery and Conservation Planning

A recovery plan or conservation strategy has not been prepared for this species. Critical habitat has not been designated for this species. Keys to conservation include providing short, sparse grasslands of adequate size. Mixed-grass areas can be made suitable for breeding mountain plovers by preserving large prairie dog colonies and, in some situations, implementing heavy grazing.

Direct and Indirect Effects on NFS Lands

Livestock grazing at moderate and high intensities can improve habitat for this species by reducing vegetation cover (Wershler and Wallis 1987, Knowles et al. 1982, Bock et al. 1993). The risk of losing nests to livestock trampling is considered insignificant (Knopf 1996). Livestock grazing at reduced intensities can result in deterioration and loss of plover habitat due to increased height and density of vegetation.

Prairie dog management focusing on colony expansion can improve mountain plover habitat.

Prairie dog shooting could result in adverse disturbances and direct and indirect risks to mountain plover (Joslin and Youmans 1999).

Burning to maintain areas of shorter grass within mixed grassland can be beneficial (Wallis and Wershler 1981, Knopf 1996). Burning of short-grass prairie attracts nesting mountain plovers (Svingen and Giesen 1999).

Oil and gas development activities can affect plover (USDA Forest Service and Bureau of Land Management 1994, U.S. Fish and Wildlife Service 2000). Oil and gas development structures can serve as raptor perches with the effect of higher mortality risks to mountain plover in the area. Increased vehicle travel due to oil and gas activities can also increase mortality risks to mountain plover. Well pads reduce the amount of suitable plover habitat. Similar effects are likely associated with coalbed methane development.

Grasshopper spraying on rangelands may negatively impact this species.

Nests and nestlings can be destroyed by off-road vehicle travel.

Disturbances from human activity can negatively affect mountain plover (Joslin and Youmans 1999).

Coal production can result in the loss of occupied and potential mountain plover habitat. Under Alternative 3, 47,990 acres are designated for mineral production and development (MA 8.4) on the Thunder Basin National Grassland. Coal production and reclamation is regulated by other state and federal agencies. The Office of Surface Mining is the federal agency with responsibility for approving mining plans. The state of Wyoming has delegated primacy for approval of mining and reclamation plans to the Wyoming Department of Environmental Quality. Forest Service reviews mining and reclamation plans to determine compliance with LRMP direction. Mining and reclamation plans also require consultation with the U.S. Fish and Wildlife Service.

Cumulative Effects

Continued conversion of rangeland to croplands can be expected to occur on private lands (USDA Forest Service 2000, Ostlie et al. 1997, Chuluun et al. 1997). Although fallow cropland may attract nesting plovers, it may also pose additional risk to females and nests due to cultivation practices.

Continued poisoning of prairie dog towns on private lands can be expected to occur. The average size of prairie dog towns on private land is likely to remain small and unsuitable for mountain plover nesting.

Absence of prescribed fire on private land is likely to continue, thereby reducing nesting habitat opportunities for mountain plover. Mountain plover use habitat that has been heavily grazed and most privately owned land is probably moderately grazed.

Oil and gas exploration and development on public domain lands could also have impacts on mountain plover and their habitat. The Bureau of Land Management has oil and gas stipulations for protecting mountain plover and their habitat.

Prairie dog poisoning on public domain lands, National Wildlife Refuges and National Parks could reduce the amount of potential and suitable mountain plover habitat. However, poisoning on federal lands by these agencies is either no longer occurring or has been limited primarily to situations involving human health or safety concerns.

Loss of prairie dog populations due to plague could adversely impact plover populations.

Construction of the new proposed railroad corridor (Powder River Basin Expansion Project) could result in some loss of mountain plover habitat on the Thunder Basin National Grassland.

Interrelated and Interdependent Actions

Oil and gas exploration and development activities, unless carefully managed, can result in habitat loss, risks, and adverse disturbances to mountain plover. Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development. Although the decision to make areas available for oil and gas leasing does not result in on-the-ground activities and possible effects on mountain plover, oil and gas stipulations to protect and conserve plovers and their habitat are needed at the time leasing availability decisions are made. Site-specific biological assessments and evaluations are also conducted at the time applications to permit drilling are considered by the Forest Service. The number of new wells predicted in the reasonable and foreseeable development analysis for the national grasslands that have occupied or potential plover habitat and moderate to high oil and gas potential is as follows:

	Oil and Gas Wells	Coalbed Methane Wells
BGNG	85	0
ONG	15	0
TBNG	140-230	600

Approximately 71%(10,100 acres) of the mountain plover habitat currently mapped on the Thunder Basin National Grassland is currently leased for oil and gas production and approximately 25%(2,600 acres) of this acreage is held under production.

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. Livestock grazing permittees commonly request prairie dog poisoning on NFS lands to reduce forage consumption and clipping by prairie dogs. The extensive number of grazing permits affects management flexibility to prescribe burn large areas.

Roadless designation and wilderness proposals would likely reduce prairie dog shooting, thereby enhancing mountain plover habitat and reducing disturbance of plovers.

Conservation Measures

The following conservation measures are presented as management direction in the revised LRMPs (Alternative 3):

Unit-wide Direction (Chapter 1)

TBNG

- Do not construct new facilities within ¼ mile of mountain plover nesting habitat (Standard).

- Limit and restrict activities and land uses in occupied mountain plover habitat to reduce disturbances and risks. This protection extends outward ¼ mile from nests and nesting areas from March 15 through July 31 (Standards, Guidelines).
- Expand mountain plover habitat through prescribed burns, livestock grazing management and by increasing prairie dog populations (see black-footed ferret evaluation) through reduced use of rodenticides, livestock grazing management, landownership adjustments, and if needed, restrictions on prairie dog shooting (Standards, Guidelines).
- Manage for no net loss of mountain plover habitat due to management activities and land uses. This is based on the amount of suitable habitat available when the activity or land use is proposed (Standard).
- In consultation with state wildlife agencies and U.S. Fish and Wildlife Service, restrict or limit prairie dog shooting from March 15 through July 31 in occupied mountain plover habitat (Guideline).
- Limit oil and gas development in mountain plover habitat to 1 well per 80 acres (Standard).
- Align new roads outside prairie dog colonies (Guideline).
- Limit vehicle speeds on resource and local roads in occupied habitat (Standard).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

BGNG, ONG, TBNG

- Expand prairie dog populations (Guidelines).
- Use prescribed burning to help meet vegetation objectives (Guideline).
- The objectives to provide specified amounts of early seral and low structure grasslands on these areas are summarized in Table H-5 and H-6 in Section 5 of this document.

BGNG, ONG

- Do not construct new facilities within ¼ mile of mountain plover nesting habitat (Standard).
- Limit and restrict activities and land uses in occupied mountain plover habitat to reduce disturbances and risks. This protection extends outward ¼ mile from nests and nesting areas from March 15 through July 31 (Standards, Guidelines).
- Expand mountain plover habitat through prescribed burns, livestock grazing management and by increasing prairie dog populations through reduced use of rodenticides, livestock grazing management, landownership adjustments, and if needed, restrictions on prairie dog shooting (Standards, Guidelines).
- Manage for no net loss of mountain plover habitat due to management activities and land uses. This is based on the amount of suitable habitat available when the activity or land use is proposed (Standard).

BGNG, ONG, cont.

- In consultation with state wildlife agencies and U.S. Fish and Wildlife Service, restrict or limit prairie dog shooting from March 15 through July 31 in occupied mountain plover habitat (Guideline).
- Limit oil and gas development in mountain plover habitat to 1 well per 80 acres (Standard).
- Align new roads outside prairie dog colonies (Guideline).
- Limit vehicle speeds on resource and local roads in occupied habitat (Standard).
- Evaluate the effectiveness of large prescribed burns in attracting and inventorying mountain plover (Standard).
- In cooperation with state wildlife agencies and U.S. Fish and Wildlife Service, evaluate desirability and feasibility of trying to establish a nesting population with reintroduced birds (Standard).

ONG

- Establish at least one prairie dog colony complex. This expansion of prairie dog colonies may provide additional mountain plover habitat. (Objectives, Guidelines)

Management Area Direction (Chapter 3)

BGNG, TBNG

- Expansion and protection of prairie dog populations in black-footed ferret reintroduction habitat (see MA 3.63 for management details in revised LRMPs).

TBNG

- Cheyenne River Zoological Special Interest Area (MA 2.1b) is established with standards to expand prairie dog populations and to reduce disturbances from management activities and other land uses. This area is 5,980 acres in size (see MA 2.1b for management details in the revised LRMP).

Monitoring Direction (Chapter 4)

BGNG, ONG, TBNG

- Continue monitoring populations and habitat.
- Monitor the effectiveness of oil and gas stipulations in protecting this species and its habitat.

Appendices

BGNG, ONG, TBNG

- Apply oil and gas stipulations (see Appendix D in revised LRMPs) for mountain plover. The primary references to support the oil and gas stipulations for mountain plover nesting habitat is U.S. Fish and Wildlife Service (2000) and Dechant et al. (1998).

Biological Determinations, Risk Assessments, and Rationale

TBNG

Determination is "not likely to jeopardize". The rationale for this determination is that prairie dog colony acreages (preferred plover habitat) and the number of larger colonies will increase under Alternative 3. Protection is also afforded to nest sites and nesting areas from disturbances and land uses (on and off prairie dog colonies) that would have adverse impacts on survival or nest success. Prescribed fire and low grassland structure levels (heavy grazing intensities) are also prescribed for selected areas, and if strategically located and timed for plovers, would also result in enhanced habitat conditions for the species. These management actions are considered beneficial effects.

Outcomes IV and VI are both selected as the risk assessment. The rationale for Outcome IV is that more than 150 (estimated) mountain plover currently use the Thunder Basin National Grassland annually, and the amount of suitable habitat will be increasing over the next 10 to 15 years. Disturbances and risks from management activities and various land uses are also reduced through numerous standards and guidelines. However, suitable mountain plover habitat in prairie dog colonies remains highly fragmented because prairie dog populations remain highly fragmented. It's assumed that under Outcome IV, problems and conflicts occurring on the winter ranges of mountain plover do not become more troublesome. Outcome VI would be a more accurate risk assessment if plague epizootics become more widespread and frequent in the future on the Thunder Basin National Grassland, but the possibility of future plague is largely beyond the control or influence of the Forest Service.

BGNG/ONG

Determination is "not likely to jeopardize a proposed species or adversely modify proposed critical habitat." Plovers have not been confirmed on or near these areas but surveys have not been conducted to current protocol standards so their presence cannot be totally ruled out at this time. Efforts to survey for plovers and to evaluate the potential of establishing nesting populations through burning, livestock grazing, and possible plover reintroductions could eventually result in significant contributions to the recovery program for this species. This is considered a possible beneficial effect.

Section 3 - Biological Evaluation for Species that are Globally Imperiled or Vulnerable and/or Candidates for Protection Under ESA

The following table displays the distribution of plant and animal species in the planning area that are ranked as G2 (imperiled globally) or G3 (vulnerable globally) by the Natural Heritage Program and/or are classified as candidate species for protection under ESA by the U.S. Fish and Wildlife Service. The sturgeon chub and black-tailed prairie dog are also candidates for protection under ESA. All of these species are classified as sensitive by the Forest Service in Region 1 and/or 2.

Table H-3. Species that are Globally Imperiled or Vulnerable and/or Candidates for Protection Under ESA.

Species	National Grassland or Forest									
	LMNG	GRCRNG	SNG	TBNG	BGNG	FPNG	ONG	NNF PRRD	NNF BRD	SRMNF
Dakota buckwheat	K	K			K		P			
Smooth goosefoot	K	K			P				P	K
Barr's milkvetch				K	K		P			
Dakota skipper	K	P	K							
Powesheik skipper			K							
Ottoe skipper	K	K		UQ	P	P	P	P	P	P
Regal fritillary	K	K	K	UQ	P	K	P	P	K	P
Sturgeon chub	UQ	UQ		UQ	K/OS					
Swift fox	UQ	UQ		K	K	UQ	K	UQ		
Black-tailed prairie dog	K	K		K	K	K	K		K	UQ

K = Known occurrence in vicinity; date of last observation indicates that species still occurs in area,

P = Possible but unconfirmed occurrence,

UQ = Species occurrence is unlikely or questionable; within species range and potential or suitable habitat may occur,

OS = Possible off-site occurrence (downstream, etc.).

Species Eliminated From Further Analysis

Screen 1 (Importance of Area)

TBNG = Ottoe Skipper (*Hesperia ottoe*)

- Rationale: This national grassland, especially the Spring Creek Geographic Area, is along the periphery of the range of this species but the species has not been observed on or near the grassland. If the species presence is confirmed in the future, this biological evaluation will be revisited and revisions to management direction considered.

TBNG = Regal Fritillary (*Speyeria idalia*)

- Rationale: This national grassland, especially the Spring Creek Geographic Area, is along the periphery of the range of this species but the species has not been observed on or near the grassland. If the species presence is confirmed in the future, this biological evaluation will be revisited and revisions to management direction considered.

LMNG = Sturgeon Chub (*Macrohybopsis gelida*)

- Rationale: Although the species was reintroduced in the Little Missouri River, follow-up surveys have not documented survival or reproduction. If the species presence is confirmed in the future, this biological evaluation will be revisited and revisions to management direction considered. FS will also consult with FWS.

GR/CRNG = Sturgeon Chub (*Macrohybopsis gelida*)

- Rationale: Although the species has been documented in the lower reaches of the Grand River, it has not been reported in or near the vicinity of the national grassland. If the species is found in the future this far west in the Grand River, this biological evaluation will be revisited and revisions to management direction considered. FS will also consult with FWS.

TBNG = Sturgeon Chub (*Macrohybopsis gelida*)

- Rationale: Although the species has been documented in the lower reaches of the Cheyenne River below Angostura Reservoir in South Dakota, it has not been reported in the upper reaches of the Cheyenne River in the vicinity of the national grassland. The species has also not been reported for the Little Powder River. If the species presence is confirmed in the future, this biological evaluation will be revisited and revisions to management direction considered. FS will also consult with FWS.

LMNG and GR/CRNG = Swift Fox (*Vulpes velox*)

- Rationale: The presence of this species on or near these national grasslands remains uncertain. If the species presence is confirmed in the future, this biological evaluation will be revisited and revisions to management direction considered. FS will also consult with FWS.

FPNG = Swift Fox (*Vulpes velox*)

- Rationale: The presence of this species on or near these national grasslands remains uncertain. If the species presence is confirmed in the future or reintroduced near the national grassland, this biological evaluation will be revisited and revisions to management direction considered. FS will also consult with FWS.

NNF (Pine Ridge Ranger District) = Swift Fox (*Vulpes velox*)

- Rationale: Although the swift fox have been observed on grasslands near the national forest, none have been sighted on the planning unit. The vegetation and topography of the national forest makes it unlikely that swift fox would occupy habitats on this area. FS will revisit this biological evaluation and consult with FWS if swift fox are eventually observed on this planning unit.

SRMNF = Black-tailed Prairie Dog (*Ludovicianus cynomys*)

- Rationale: Although prairie dogs may disperse into or across this area, there are no prairie dog colonies currently on this planning unit. There are no records of authorized prairie dog poisoning. If a colony is confirmed in the future, this biological evaluation will be revisited and revisions to management direction considered. FS will also consult with FWS.

Species Evaluations

Dakota Buckwheat (*Eriogonum visheri*)

Species Description

Dakota buckwheat is an erect spreading herbaceous annual containing both basal and cauline leaves and arising from a slender taproot (Heidel and Dueholm 1995). Small yellow flowers occur on an open inflorescence. It has shiny, dark brown achenes (Flora of the Great Plains 1986). It is a member of the Polygonaceae family.

Dakota buckwheat first emerges in the spring from May through late June, depending on its geographic location. Flowers first appear from late June to late July and continue to be produced into September. Seeds ripen and fall throughout this period. This species is wind-pollinated and self-fertile (Ode 1987). Seed is dispersed by wind and water action.

Distribution and Status

Table H-3 summarizes species occurrence in the planning area. Dakota buckwheat is considered a regional endemic to western North Dakota, western South Dakota, and southeast Montana (NatureServe 2000, Montana Natural Heritage Program 2000). Known occurrences on or near NFS lands within the planning area include the Little Missouri, Grand River/Cedar River, and Buffalo Gap National Grasslands. It may be possible that the species could occur on the Oglala National Grassland. Forest Service maps of occurrence locations were consulted. All of these National Grasslands probably contain potential and suitable habitat that could function as important refugia for the species. The Little Missouri and Buffalo Gap National Grasslands contain some of the most extensive populations of this species.

Dakota buckwheat is considered a regional endemic to North Dakota and South Dakota, with a high probability that this species may also occur in Montana (Lenz 1993). The eight county distribution for South Dakota is associated with the badlands along the Grand River and Moreau River drainages in the northwestern part of the state and the badlands in south central South Dakota. Most federally administered Dakota buckwheat populations are located within the Northern Great Plains planning area although a population was discovered in 1993 on the Sioux Ranger District of the Custer National Forest in South Dakota (Heidel and Dueholm 1995). Dakota buckwheat has the distinction of being the only known vascular plant that is endemic to the Dakotas (Ode 1987).

Dakota buckwheat is known from 43 element occurrence records in North Dakota (North Dakota Natural Heritage database 2000). In South Dakota, Dakota buckwheat is known from 38 populations on or near the Buffalo Gap National Grassland and 16 populations on or near the Grand River/Cedar River National Grasslands (South Dakota Natural Heritage database 2000). The size of these populations varies widely from few to several thousand individuals. In Montana, the species has been documented at a single location in the southeast part of the state (Montana Natural Heritage Program 2000).

The species was first collected and identified as a new species by Stephen Sargent Visher in 1912 and described as a new species in 1913 by Aven Nelson. The species did not receive full recognition as a taxonomically distinct species until James Reveal studied the genus *Eriogonum* more thoroughly in the 1960s (Ode 1987).

ESA Status and Other Organization Rankings

TNC / NHP G3, N3; BLM - Sensitive; FS – Sensitive (R1 and R2)

The species has no ranking under ESA. The species is ranked as S2 / S3 in North Dakota and S3 in South Dakota (NatureServe.com). S2 ranking signifies that the species is imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of other factors making it very vulnerable to extirpation from the state. S3 ranking is rare in the state (20+ occurrences). Dakota buckwheat is ranked as S1 in Montana, meaning critically imperiled because of extreme rarity.

Habitat

Dakota buckwheat is considered an obligate resident of badlands. It is a primary successional species that inhabits mostly barren, actively eroding clay and shale substrates. Important habitats are toeslopes of eroding clay knobs. These badlands landforms contain habitats for a variety of plant and wildlife species not commonly found in the adjacent rolling grassland plains (Ode 1987).

Common native plant species found with Dakota buckwheat include broom snakeweed, saltbush, and knotweed. Non-native and invasive plant species found in buckwheat habitat include Russian thistle, sweetclover, and kochia.

Soil analyses demonstrate that Dakota buckwheat grows in a very harsh soil environment characterized by dense clay soils that are sodium-affected and nutrient-poor (Ode 1987). In addition, these soils have a high shrink-swell capacity. These characteristics inhibit secondary plant succession and provide Dakota buckwheat with a habitat niche that is largely free from most plant competition.

Conservation Planning

A conservation strategy has not been prepared.

Direct and Indirect Effects on NFS Lands

Immediate threats to known populations include habitat invasion by non-native plant species and development activities (Lenz 1993). Competition from non-native and invasive plants, such as Russian thistle and kochia, can be a significant threat. Noxious weeds such as leafy spurge and Canadian thistle occur in scattered populations throughout the mixed grass and shortgrass plains. Noxious weeds reduce the quality of habitat but at the same time, efforts to control spurge and other noxious weed species with chemicals can pose a direct threat to Dakota buckwheat.

Roads can negatively affect Dakota buckwheat populations by introducing non-native plant species along travel routes, by habitat fragmentation, and by loss of suitable habitat to disturbance.

Ground-disturbing activities associated with oil and gas development, mineral exploration, scoria pits, and other types of development could result in mortality of Dakota buckwheat plants or place their populations at risk.

Recreation can have negative effects on Dakota buckwheat plants and populations, depending on types of recreational use, road and trail use patterns and intensities, rate of spread of invasive and non-native plant species along recreational routes, and other factors. Even limited

recreation use on fragile claypan habitat may be detrimental to Dakota buckwheat. Trampling from recreational uses can result in mortality to individual plants.

Burning may directly impact the species by causing mortality or indirectly through modification of its habitat. Most buckwheat habitat contains scarce vegetative cover and probably is not at high risk for frequent fire regimes.

Excessive livestock trampling can interfere with reproduction of Dakota buckwheat or can damage individual plants. Livestock trampling during wet times of year can cause excessive soil compaction and may result in reduced plant vigor for the buckwheat. At the same time, some hoofprint depressions have created habitat microniches used by the species. Livestock grazing at light to moderate intensities does not seem to be a threat (Ode 1987).

Cumulative Effects

Many of the threats listed above for NFS lands also occur on other nearby land jurisdictions.

Interrelated and Interdependent Actions

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development. Site-specific biological assessments and evaluations are conducted at the time applications to permit drilling are considered by the Forest Service and potential effects on any Dakota buckwheat populations in the proposed project area are addressed then.

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in the revised LRMPs (Alternative 3):

Unit-wide Direction (Chapter 1)

LMNG, GRCRNG, BGNG, ONG

- Prioritize this species for preparation of a conservation strategy (Objective).
- Conduct target surveys for this species (Objective).
- Manage vegetation so native forbs periodically complete their full reproductive cycle. (Standard, Guideline)
- Do not authorize new developments or placement of salt or minerals in occupied habitat (Guideline).
- Prioritize occupied habitat for noxious weed control using methods that do not pose adverse risks to Dakota buckwheat (Guideline).
- Design timing, intensity and frequency of mowing, burning and livestock grazing to benefit Dakota buckwheat (Standard).
- Require permits to collect sensitive plants or parts of sensitive plant species (Standard).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

- None

Management Area Direction (Chapter 3)

BGNG

- Establishment of the 12,030-acre Rake Creek backcountry nonmotorized area (MA 1.31) will eliminate risk of off-road vehicle travel to Dakota buckwheat populations in this area.

Monitoring Direction (Chapter 4)

LMNG, GRCRNG, BGNG, ONG

- Continue monitoring populations and habitat.

Biological Determinations, Risk Assessments, and Rationale

LMNG, GRCRNG, BGNG

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Dakota buckwheat habitat is locally abundant and widely distributed throughout its range on the national grasslands. Additional suitable habitat occurs on private, state, and other federal lands. Under Alternative 3, protection is provided for known populations and their habitat. Therefore, there's a higher likelihood for long-term viability of the populations on and in the vicinity of the national grasslands as a result of the management direction in the revised LRMPs. However, the continued spread of noxious weeds and non-native and invasive plant species remains a potentially serious concern in localized areas.

Outcomes II and IV are selected as the risk assessments. Where populations are well distributed across the landscape, Outcome II is selected because recolonization of suitable but unoccupied habitat is more likely. Outcome IV is selected where the populations are more isolated and if lost, recolonization from other populations would be less likely. Successful transplants of this species into suitable and unoccupied habitat have not been demonstrated.

ONG

Determination is "no impact". The species presence on this area has not been confirmed and documented. However, management direction is provided for this species and potential habitat on this area. If the species presence had been confirmed, the determination would have been "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Smooth Goosefoot (*Chenopodium subglabrum*)

Species Description

Smooth goosefoot is a slender, annual forb with linear leaves and well developed branches (Heidel and Dueholm 1995). It is distinguised on the basis of its linear, 1-veined smooth leaves. The tiny flowers are borne in clusters on slender panicles. Each flower lacks petals but has 5 sepals and 5 stamens. The 1-seeded fruit is compressed and relatively large; 1-2 mm across. (Montana Natural Heritage Program 2000, Great Plains Flora Association 1986).

This species is recognized most readily when mature, starting at the end of June until late August or September (Heidel 1990). It is distinguished by its readily detachable seed pericarp that exposes a jet-black seed. It flowers from July through September. Smooth goosefoot is a member of the Chenopodiaceae family.

Distribution and Status

Table H-3 summarizes smooth goosefoot occurrence in the planning area. The species is known from populations on or near the Little Missouri and Grand River / Cedar River National Grasslands. Smooth goosefoot has also been found on the Samuel R. McKelvie National Forest. The closest known population to the Thunder Basin National Grassland occurs further south on state land in Converse County, Wyoming (Wyoming Natural Heritage Program database 2000). Species distribution is centered in Nebraska and South Dakota, with additional outlying populations found in southern Canada, eastern Oregon, and Washington, through the western states to North Dakota, Kansas, Wyoming, Colorado, Utah, Nevada, Montana, and Idaho. However, records from at least five of these states are in question (Lenz 1993). Efforts to relocate South Dakota historic collections from the Sioux Ranger District on the Custer National Forest were unsuccessful (Heidel and Dueholm 1995). The species was first collected in North Dakota in 1946. All of the known populations in North Dakota are very small, and habitat is considered limited and threatened (Lenz 1993).

The Great Plains Flora Association (1986) notes that smooth goosefoot is quite rare and has been collected infrequently during the past several decades. The population(s) located during the 1989 survey of Theodore Roosevelt National Park is among the most recent collections of this species anywhere (Heidel 1990).

There are three records of smooth goosefoot on the Little Missouri National Grassland, all of which are located along the sandy floodplains of the Little Missouri River (North Dakota Natural Heritage database 2000). There are an additional six populations in Little Missouri River floodplain habitat on private and National Park Service land. The North Dakota Natural Heritage Element Occurrence Rankings for most of the known populations range from fair viability to probably not viable (North Dakota Natural Heritage database 2000). The EO rankings are based upon integrated measures of population size, population condition, and landscape context.

In 1993, the Little Missouri River experienced significant flood events that may have affected some of the known populations on the Little Missouri National Grassland. Subsequent monitoring of some of the populations since the flooding event has resulted in the inability to verify several of the previously known populations (S. Rinehart, field notes). It is not known if populations within the National Park were also affected. Therefore the population occurrences

for this species may have been reduced in North Dakota. No target surveys have been conducted since the flood for this species (North Dakota Heritage Program, Kathy Duttenhefner, personal communication).

In 1999, the species was located on the Grand River Sand Dunes on the Grand River National Grassland in South Dakota (S.Rinehart, field notes). The small population was found within the 6EN Sand Dune exclosure. The majority of the population was found growing in conjunction with the narrow ecotone of stabilizing sand and pioneer vegetation trailing the actively moving sand dune. This area is fenced from livestock grazing.

ESA Status and Other Organization Rankings

TNC / NHP G3; IUCN - Rare; COSEWIC - V; FS – Sensitive (R1).

Smooth goosefoot is ranked as S1 in the State of North Dakota, critically imperiled because of extreme rarity (5 or fewer occurrences or few remaining individuals or acres) or because of some factor in its biology making it especially vulnerable to extinction. In addition, known populations contain very few individuals. Smooth goosefoot is ranked as S1 in Montana, S3 in Nebraska, SU in South Dakota, and S2 in Wyoming (NatureServe.com). In addition, it is given a rarity rank in Alberta, Manitoba, and Saskatchewan.

To date, the U.S. Fish and Wildlife Service has not considered the species for listing as threatened and endangered, and it cannot be considered until distribution and taxonomy are settled in the western parts of the species' range (Heidel 1990).

Habitat

Smooth goosefoot appears to be restricted to sand dunes, sandy soils, and sandy riverbanks (Great Plains Flora Association 1986, Heidel 1990, Lenz 1993). It is considered a primary successional species on actively eroding slopes at the edge of stabilizing sand (Smith and Bradley 1990). Populations are highest in areas of finer and more compacted sand. In addition, the species is tolerant of alkali-impregnated areas, including areas that are so sodium affected few other plants will grow there. The species is considered both a halophyte (salt-loving) and xerophyte (adapted for growth under dry conditions) plant. Populations throughout its range on all habitats are always very low (Smith and Bradley 1990).

In addition, Heidel (1990) noted that the species is found intermittently along a narrow discontinuous band of early successional habitat of the Little Missouri River in western North Dakota. In this habitat, it grows near the edge of sandy riverbank terraces that are ephemerally flooded and where bare soil is exposed. It was also noted that smooth goosefoot prefers open to partially shaded habitat.

Within the planning area, longterm threats to the species and its habitats are loss of successional habitat from altered natural processes of fire, rest, and grazing regimes. In its riverine habitat, Heidel (1990) identified loss of habitat from altered river hydrology and diminished river successional stages.

The greatest intermediate threats to smooth goosefoot are non-native and invasive plant species, including noxious weeds such as leafy spurge and Russian knapweed. In addition, the use of chemical herbicide spraying to control noxious weeds can also cause mortality to the species. Livestock grazing and trampling can also damage individuals and reduce populations.

Throughout the planning area, smooth goosefoot is uncommon and populations are sparse, even in what appears to be suitable habitat (Heidel 1990).

In Canada, the species is found on sand dunes and sandy hills within the mixed grass plains. The primary threats to its habitat occur from conversion of native grassland to tame pasture and cropland, loss of natural habitat through changes in grazing and fire regime, invasion of non-native species, and management that has favored stabilization of sand dunes (Smith and Bradley 1990). A study on stabilization of sand dunes in Canada attributes a lack of fire cycle to a loss in the dynamic nature of actively moving sandy areas. Large areas of sandy plains in Canada have become stabilized over the last forty years (Smith and Bradley 1990).

Conservation Planning

A conservation strategy has not been prepared.

Direct and Indirect Effects on NFS Lands

In North Dakota, primary management threats are invasion by non-native plant species and noxious weeds, particularly leafy spurge and Russian knapweed that can overrun habitat along the Little Missouri River (Lenz 1993). All of the 1989 populations on the Theodore Roosevelt National Park were in proximity to leafy spurge (Heidel 1990). Noxious weeds such as leafy spurge can be a significant threat to this species. Leafy spurge prefers riparian habitats and large populations are found along the Little Missouri River in habitats occupied by smooth goosefoot. Noxious weeds reduce the quality of habitat but, at the same time, efforts to control spurge and other invasive species with chemicals can pose a direct threat to smooth goosefoot. In addition, many chemicals are restricted for use within riparian zones. Biocontrol may be especially important in riparian habitats occupied by smooth goosefoot.

The primary threats to the population on the Grand River National Grassland are competition from invasive and non-native plants including smooth brome and other aggressive grass species that were introduced to help stabilize the sand dune. Non-native plant species such as Kentucky bluegrass and smooth brome compete with this species for habitat, especially on more mesic sites. On drier sites, exotic species such Russian thistle), sweetclover, crested wheatgrass, and kochia compete aggressively with this species. Invasive species are spread by vehicles along road corridors and by ORVs, vehicles, and livestock. Heavy livestock grazing seems to encourage spread of Russian thistle, sweetclover, and kochia.

Management activities can cause a loss of equilibrium in riparian systems such as the Little Missouri River, resulting in excessive flooding events along drainages and excessive erosion, sedimentation, and / or channelization. This, in turn, may reduce successional habitat for smooth goosefoot.

Sand dune habitat for smooth goosefoot requires a fire regime to retain the active nature of these communities. At the same time, burning may directly impact the species by causing mortality to individuals and populations.

Off-road vehicle use on sand dunes and sandy areas can harm individuals and alter habitat.

Burning and livestock grazing can have positive or negative effects on smooth goosefoot depending on frequency, intensity, and timing of disturbance. Many sand dunes and actively eroding sandy areas have been stabilized by changes in grazing and fire regimes, resulting in loss of open soil conditions required by the species. Livestock may graze on smooth goosefoot, preventing the species from completing its life cycle or resulting in loss of individuals.

However, livestock grazing may be beneficial after seed set. Grazing can reduce dead material and open up canopy layers of plants, allowing for the germination and establishment of new plants. Excessive livestock trampling in riparian areas and repeated visits to these areas for water can be a problem for smooth goosefoot. Individual plants may be directly affected by trampling. Livestock trampling can interfere with species reproduction if damage occurs early in the year during flowering and seed stages. Excessive and repeated soil compaction may result in reduced plant vigor for smooth goosefoot.

Roads can negatively affect smooth goosefoot populations by introducing non-native plant species along travel routes, by habitat fragmentation, and by loss of suitable habitat to disturbance.

Ground-disturbing activities associated with oil and gas development, mineral exploration, scoria pits, and other types of development could result in mortality to the species and place populations at risk.

Recreation can have negative effects on smooth goosefoot populations resulting in trampling of the species, soil compaction, and introduction of invasive and non-native species.

Cumulative Effects

Continued loss of suitable habitat through conversion of rangelands to croplands (USDA Forest Service 2000, Ostlie et al. 1997, Sieg et al. 1999) and tame pasture can be expected to occur on private lands.

- Stabilization of sand dunes and actively eroding sandy areas will continue on private lands, resulting in continued loss of habitat for this species.
- Development activities such as road building and facilities construction will continue, resulting in some loss of suitable habitat for this species and some possible plant and population mortality.
- Changes in livestock grazing and fire regimes that are unfavorable for the conservation of this sensitive plant species will continue on both private and public lands.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD), eventual on-site development, and additional roads, traffic, and pipelines. Site-specific biological assessments and evaluations are conducted at the time applications to permit drilling are considered by the Forest Service and potential effects on any smooth goosefoot populations in the proposed project area are addressed then.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in the revised LRMPs (Alternative 3):

Unit-wide Direction (Chapter 1)

LMNG, GRNG, BGNG, NNF (BRD), SRMNF

- Prioritize this species for preparation of a conservation strategy (Objective).
- Conduct target surveys for this species (Objective).
- Manage vegetation so native forbs periodically complete their full reproductive cycle. (Standard, Guideline)
- Do not authorize new developments or placement of salt or minerals in occupied habitat (Guideline).
- Prioritize occupied habitat for noxious weed control using methods that do not pose adverse risks to smooth goosefoot populations (Guideline).
- Design timing, intensity and frequency of burning and livestock grazing to benefit smooth goosefoot (Standard).

LMNG, GR/CRNG

- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).
- Require permits to collect sensitive plants or parts of sensitive plant species (Standard).

Geographic Area Direction (Chapter 2)

BGNG, NNF (BRD), SRMNF

- Conduct target surveys for the species prior to construction or other ground-disturbing activities (Standard).
- Establish and maintain quality habitat for this species (Standard).
- Prioritize control of noxious weeds in occupied habitat (Standard).
- Discourage establishment of invasive and non-native plant species into suitable habitat (Standard).
- Restrict ORV use in occupied habitat (Standard).

Management Area Direction (Chapter 3)

GRNG

- Establishment of the 100 acre Grand River Sand Dune Special Interest Area that provides habitat for this species.

Monitoring Direction (Chapter 4)

LMNG, GRNG

- Continue monitoring populations and habitat.

Biological Determinations, Risk Assessments, and Rationale

LMNG, GRNG

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Outcome VI is selected as the risk assessment for this species on and near these areas. Although the LRMP provides protection for known populations and prescribes specific management to maintain sandy habitat under beneficial disturbance processes, smooth goosefoot is known only from small isolated populations. This makes populations vulnerable to extirpation as a result of many possible factors such as the continued spread of noxious weeds and non-native and invasive plant species. Some of these factors are largely beyond the control of the Forest Service. The population on the Grand River National Grassland is protected within the Grand River Sand Dunes Special Interest Area but is still vulnerable.

SRMNF

No biological determination is made for this species on these areas because the species is not listed as sensitive in Region 2 of the Forest Service. However, management direction is provided for this species and its habitat on these areas.

BGNG, NNF (BRD

No biological determination is made for this species on these areas because the species is not listed as sensitive in Region 2 of the Forest Service, and its presence on these areas has not been confirmed and documented. However, management direction is provided for this species and potential habitat on these areas. If the species presence had been confirmed, the determination would have been "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Barr's Milkvetch (*Astragalus barrii*)

Species Description

This perennial forb is endemic to the northern Great Plains region. The plant grows in low, dense mats and its trifoliate leaves are densely pubescent (Flora of the Great Plains 1986). The species flowers from June through August, depending on locality and annual weather patterns. As a long-lived perennial, it may produce few or no flowers in any particular year. This species was first described by R.C. Barneby in 1956. It is a member of the Fabaceae family.

Distribution and Status

Table H-3 summarizes species occurrence in the planning area. The species is known to occur on the Buffalo Gap National Grassland and may be possible of occurring on the Oglala National Grassland. It is also known from four populations on the Thunder Basin National Grassland in Wyoming and an additional population near the national grassland (Wyoming Natural Heritage Program database 2000). In South Dakota, Barr's milkvetch is known from 16 populations on or near the Buffalo Gap National Grassland (South Dakota Natural Heritage database 2000).

Barr's milkvetch occurs in sparse populations in four counties in southwest South Dakota, six counties in northeast Wyoming, and three counties in eastern Montana (Schassberger 1990). It is also reported from a single location in Nebraska north of Chadron. (NatureServe.com 2000). Throughout its range, the species is known from 80 extant sites comprising at least 17, 000 individuals (NatureServe.com 2000).

ESA Status and Other Organization Rankings

TNC / NHP G3; IUCN - Rare; FS – Sensitive (R1)

The species has no status under ESA. Barr's milkvetch is ranked as S1 in Nebraska, critically imperiled because of extreme rarity (5 or fewer occurrences or few remaining individuals or acres) or because of some factor in its biology making it especially vulnerable to extinction (NatureServe.com 2000). It is ranked as S3 in South Dakota, Wyoming, and Montana, either very rare or found locally within a restricted range (threatened within its range).

Habitat

The species occurs in areas of sparse vegetative cover. Within the planning area, it is found on eroding knolls, buttes, and hilltops in thin barren soil that has eroded from sandstone or siltstone. The species appears to be restricted to specific rock stratum in and along several major drainages (Schassberger 1988). Schassberger (1988) states that due to its intolerance to competition from other plant species, it may not be present in habitat in more advanced successional stages. In the Montana portion of its range, the species has occassionally been found with overstory cover such as ponderosa pine, Rocky Mountain juniper, big sagebrush, and shadscale (Schassberger 1988). In Montana, the species is found on eroding knolls and barren hilltops of a particular limestone caprock. In Wyoming, the Powder River populations of the species are found on eroding sandstone bluffs.

Drought-induced loss of individual Barr's milkvetch plants in Montana suggests that a long-term change towards a warmer and drier climate might threaten the existence of some populations, especially those on more exposed locations (Schassberger 1990).

Conservation Planning

A conservation strategy has not been prepared.

Direct and Indirect Effects on NFS Lands

Competition from non-native invasive plants can be a significant threat to Barr's milkvetch. Invasive species such as broom snakeweed and sweetclover can out compete milkvetch and reduce population numbers. Invasive species are often spread by livestock grazing, roads, and recreational activities.

Noxious weeds reduce the quality of habitat for this species. At the same time, efforts to control leafy spurge, Canadian thistle, and other species with chemicals can pose a direct threat to Barr's milkvetch.

Burning can have positive or negative effects on the species depending on frequency, intensity, and timing of disturbance. Burning may directly impact the species by causing mortality or indirectly through modification of its habitat.

Livestock grazing can reduce dead material within plant communities and open up canopy layers of plants, allowing germination and establishment of new plants.

Livestock trampling that causes excessive and repeated soil compaction may result in reduced plant vigor. In addition, individual plants may be directly affected by trampling.

Grasshopper spraying has the potential to impact insect pollinator populations (Arenz and Joern 1996, Ostlie et al. 1997). Information about specific pollinators for this species is lacking, however it is suspected to be insect pollinated (Schassberger 1990).

Excessive removal of vegetation on uplands can result in rill, sheet, and gully erosion and excessive soil and water runoff. Increased erosion can result in lowered water tables. Any activities that lower water tables below the effective rooting zone of this species will place individual plants or populations at risk.

Ground-disturbing activities associated with oil, gas, mineral, and other types of development could result in loss of Barr's milkvetch plants or populations.

Recreation can have negative effects depending on types of recreational use, road and trail use patterns and intensities, and rate of spread of non-native plant species along recreational routes. Even limited recreation use on shallow soil habitat may be detrimental to Barr's milkvetch.

Off-road vehicles can harm Barr's milkvetch plants and alter habitat.

Coal production could result in loss of suitable habitat for the species. However, none of the existing populations on the Thunder Basin National Grassland occurs within Management Area 8.4 (mineral production and development).

Cumulative Effects

Many of the same effects listed above occur on adjoining land jurisdictions.

Insecticide spraying on adjacent lands may reduce or threaten insect pollinators (Arenz and Joern 1996, Ostlie et al. 1997).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development. Site-specific biological assessments and evaluations are conducted at the time applications to permit drilling are considered by the Forest Service and potential effects on any Barr's milkvetch populations in the proposed project area are addressed then.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in the revised LRMPs (Alternative 3):

Unit-wide Direction (Chapter 1)

BGNG, ONG, TBNG

- Prioritize this species for preparation of a conservation strategy (Objective).
- Conduct target surveys for this species (Objective).
- Manage vegetation so native forbs periodically complete their full reproductive cycle. (Standard, Guideline)
- Do not authorize new developments or placement of salt or minerals in occupied habitat (Guideline).
- Prohibit use of pesticides that would adversely affect species at risk (Guideline).
- Prioritize occupied habitat for noxious weed control using methods that do not pose adverse risks to Barr's milkvetch populations (Guideline).
- Design timing, intensity and frequency of burning and livestock grazing to benefit Barr's milkvetch (Standard).

Geographic Area Direction (Chapter 2)

- None

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

BGNG, ONG, TBNG

- Continue monitoring populations and habitat.

Biological Determinations, Risk Assessments, and Rationale

BGNG and TBNG

No determination is made for this species on these national grasslands because Barr's milkvetch is not listed as sensitive in Region 2 of the Forest Service. However, management direction is provided for this species and potential habitat on these areas. Outcome II is selected as the risk assessment for this species on and near these national grasslands. Numerous populations occur across both of the national grasslands. Given the management direction that protects Barr's milkvetch and the fact that its habitat does not seem to be highly susceptable to excessive livestock grazing, construction, fire, or noxious weed establishment, these populations should be relatively secure.

ONG

Biological determinations and risk outcomes are not provided for this species on the national grassland because Barr's milkvetch is not listed as sensitive in Region 2 of the Forest Service and because there are currently no known populations on the national grassland. However, management direction was provided for this species and potential habitat.

Dakota Skipper (*Hesperia dacotae*)

Royer and Marrone (1992), Dana (1991), and Opler et al. (1995) which is available on the Northern Prairie Wildlife Research Center website (www.npwrc.usgs.gov) were consulted as primary references for this species.

Species Description

The Dakota Skipper is a moderate-sized butterfly with a wingspan of approximately 1 to 1 3/8 inches. It displays the hooked antennae typical of skippers, and has a characteristic rapid, skipping flight. The wings of the male are dark orange on the dorsum, and light orange on the ventrum. The female is darker brown above and grayer below (Royer and Marrone 1992).

After hatching, Dakota skipper larvae move downward to the ground surface, where they build a subsurface burrow-like chamber. Young larvae spend most of their time in this burrow, leaving only to feed at night (Klassen et al. 1989). Older larvae move into debris-covered silk chambers on the ground surface (Dana 1991). Larvae feed on grasses, particularly little bluestem (Royer 1996). Larvae overwinter as fourth instar, and resume feeding the following spring. Adults emerge from pupal stage in mid-June in western North Dakota and the third week of June in eastern North Dakota. Like others in the skipper family, adults are diurnal and feed on nectar of selected forbs. Mating occurs shortly after emergence. The main flight of adults lasts from two to three weeks. Females oviposit on grasses and forbs (Dana 1991).

Distribution and Status

The Dakota skipper historically ranged from southern Manitoba through North Dakota, Minnesota, South Dakota, Iowa, and Illinois. The species is now largely restricted to northeastern South Dakota, western Minnesota, and the drift prairie area of North Dakota (Royer and Marrone 1992).

Table H-3 summarizes this species' occurrence in the planning area. Several extant sites are documented in North and South Dakota, including on or near the Little Missouri and Sheyenne National Grassland (Royer and Marrone 1992, Royer 1995, Royer 1996, Swengel and Swengel 1999). Dakota skippers have been observed near the Grand River National Grassland and may be present on the Grand River and Cedar River National Grasslands, but inventories are incomplete.

The Dakota skipper is unusually sensitive to land management, and some sites on the Sheyenne National Grassland may have already been lost (Royer and Marrone 1992).

ESA Status and Other Organization Rankings

TNC / NHP G2 / 3; FS – Sensitive (R1)

The Dakota skipper has no special status under ESA.

Habitat

The Dakota skipper is considered an obligate resident of undisturbed tallgrass to mixed grass prairies. Two types of habitat are used. In eastern North Dakota (which includes the Sheyenne National Grassland), bluestem prairie is the preferred habitat. Suitable sites contain wood lily, harebell, and alkali grass (Royer and Marrone 1992). Little bluestem, bluegrass, and Scribner panicgrass are important caterpillar hosts. Extensive stands of narrow-leaved purple coneflower may also be present (Royer and Marrone 1992). Purple coneflower, fleabane, black-eyed susans and harebell are some of the important nectar sources for adult skippers. In western North Dakota (which includes the Cedar River and Little Missouri National Grasslands), drier habitats are used. This may also be the case on the Grand River National Grassland in northwest South Dakota. On the Little Missouri National Grassland, this habitat is most likely to occur along river valleys. Harebell and wood lily are often present, as is purple coneflower (Royer and Marrone 1992).

Conservation Planning

Moffat and McPhillips (1983) provide a general set of habitat management guidelines for butterflies in the northern Great Plains. Dana (1991) developed management guidelines for a reserve in southwest Minnesota. Royer and Marrone (1992) prepared a conservation assessment on this species for North and South Dakota.

Direct and Indirect Effects on NFS Lands

Areas heavily grazed by livestock are not used by Dakota skipper (McCabe 1981), and lightly grazed areas may be unsuitable (Dana 1983).

Habitat that is invaded by exotics, such as brome grass, leafy spurge, and to some extent, bluegrass, are soon degraded (Royer and Marrone 1992). Careful use of herbicides to control exotic invasive plant species can help enhance habitat management for this species.

Prescribed burning is also a significant cause of mortality (Dana 1991, NatureServe 2000, Swengel 1996). Mortality rates from prescribed burning are influenced by date (with early spring burning being less impactive) and fuel loads (burns of low-fuel areas are less impactive).

Mowing and haying in late fall may be favorable for maintaining skipper habitat (McCabe 1981, Dana 1983, Swengel 1996, Swengel and Swengel 1999).

Insecticide spraying on adjacent lands may reduce or threaten non-target insect populations (Arenz and Joern 1996, Ostlie et al. 1997).

Cumulative Effects

Many of the effects listed above are likely occurring on adjoining private lands, and within the administrative boundaries of these National Grasslands.

Additional threats to the species on adjacent private lands, as well as throughout the species' former range in the planning area, are the continuing conversion of native grasslands to cropland, broadscale insecticide applications, and use of grasslands for hay production (USDA Forest Service 2000, Ostlie et al. 1997, Chuluun et al. 1997).

Approximately 40% of the private rangelands on the northern prairie (71 million acres) are in poor to fair range condition and this indicates a loss of higher successional plant communities

(Natural Resources Conservation Service 1996). Rangelands in these conditions provide unsuitable to marginally suitable habitat for this species.

Interrelated and Independent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

Moffat and McPhillips (1983) suggested the following for Dakota skipper management:

- Manage to reduce or eliminate bluegrass, brome grass, and western snowberry, through very late (October) mowing,
- Fire is not recommended for this species on small sites.

Dana (1991) offered the following recommendations relevant to the types of management proposed in this document:

- Use fire to maintain healthy prairie, keeping in mind the high mortality that likely occurs with late spring, summer, or early fall burns,
- To keep fuel loads low, prescribed burns should occur every third season,
- Divide sites into several management units, and burn them in rotation,
- Use grazing and mowing along with fire to manage for healthy prairie.

The following conservation measures are presented as management direction in the revised LRMP (Alternative 3):

Unit-wide Direction (Chapter 1)

LMNG, SNG, GR/CRNG

- Modify livestock grazing during drought to reduce impacts to habitat (Standard).
- Manage for native forb abundance and diversity (Guideline).
- Delay mowing until July 15 or later (Guideline).
- Numerous objectives, standards and guidelines call for enhanced riparian regeneration and health.
- Maintain hydrological regimes and protect and restore developed springs and seeps (Guideline).
- Design vegetation management and pesticide application projects to reduce mortality and to maintain nectar and larvae host plants (Guideline).
- Do not authorize vegetation management and construction projects that would further isolate populations or prevent recolonization (Standard).
- Prohibit control of native insects until an evaluation of impacts to other resources is made (Guideline).

LMNG, SNG, GR/CRNG, cont.

- Prohibit use of pesticides that would adversely affect species at risk (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

LMNG, SNG, GR/CRNG

- The objectives to provide specified amounts of ungrazed and high structure grasslands on these areas are summarized in Table H-5 and H-6 in Section 5 of this document.

SNG

- Emphasize late fall mowing instead of prescribed burning at historic or known sites with Dakota skipper. (Guidline)
- Rest areas with historic or known populations of sensitive skippers (Guideline).
- Conduct butterfly and skipper surveys (Guideline).

Management Area Direction (Chapter 3)

SNG

- Initiate intensive restoration efforts to meet desired conditions that include active and passive methods. (Guideline under MA 3.64)
- Native reseeding project may be initiated with local seed sources. (Guideline under MA 3.64)
- Dakota skippers are found in the proposed 240 acre Fritillary Prairie RNA. RNAs will be managed to protect their ecological values. Management plans will be completed within 5 years.

Monitoring Direction (Chapter 4)

LMNG, SNG, GR/CRNG

- Continue monitoring populations and habitats.

Appendices

LMNG, SNG, GR/CRNG

- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

SNG, LMNG, GRCRNG

The determination of effect for Alternative 3 is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide". This determination was reached after considering that

Alternative 3 would result in improved habitat conditions for the Dakota skipper through the implementation of more rest (especially the emphasis on resting sensitive skipper sites on the Sheyenne National Grassland), as well as the increased emphasis on restoring native vegetation (especially forbs). Alternative 3 would also result in increased high structure and late sere habitat, as well as focus survey efforts on for this species on the Sheyenne National Grassland.

In terms of risk assessment, the situation near the Sheyenne National Grassland is of great concern. Alternative 3 would improve habitat conditions for Dakota skipper over the planning period. Extant Dakota skipper populations exist on and near (Brown Ranch Nature Conservancy property) the National Grassland, so recolonization of restored habitat is possible. However, these extant populations are small and thus susceptible to extirpation from stochastic events. If such an event occurred before restored habitat on the Sheyenne National Grassland was recolonized (restoration of suitable habitat conditions will likely take several years), the species would be extirpated locally. This is due to the lack of nearby alternate populations, and the general scarcity of native grasslands in this region (Chuluun et al. 1997). Successful reintroduction of this species has not been demonstrated. Therefore, an Outcome VI is selected as the risk assessment.

Outcome IV is selected as the risk assessment for this species on the Little Missouri and Grand River / Cedar River National Grasslands (assuming the species is present). The primary rationale is the proposed use of rest and emphasis on increasing vegetative structure and floristic diversity. The added emphasis on riparian regeneration and health also supports this evaluation. Recolonization of any populations lost on the national grassland from other source populations is more likely due the more continuous and less fragmented habitat (Chuluun et al. 1997) compared to that occurring near the Sheyenne National Grassland.

Powesheik Skipper (*Oarisma powesheik*)

Royer and Marrone (1992), Swengel and Swengel (1999), and Opler et al. (1995) which is available on the Northern Prairie Wildlife Research Center website (www.npwrc.usgs.gov) were consulted as primary references for this species.

Species Description

The Powesheik skipper (aka Powesheik or eastern skipperling) has 1-inch wide, triangular, dark brown upper wings, and pale brown underwings with white veins. In southeastern North Dakota (near the Sheyenne National Grassland), the main flight typically occurs in late June to early July (Royer 1996). Mating occurs soon after emergence. Eggs are deposited on host plant leaves, which the larvae begin consuming after hatching. The fifth-stage caterpillar hibernates over winter.

Distribution and Status

The Powesheik skipper was historically common across the tallgrass prairies but is now restricted to isolated, remnant sites. Its current distribution extends from Michigan west to southeastern Manitoba, and eastern North and South Dakota. Several sites are documented in southeastern North and northeastern South Dakota.

Table H-3 summarizes occurrence in the planning area. The only known occurrence within the planning area is on the Sheyenne National Grassland. Royer and Marrone (1992) have failed to relocate the species on the Sheyenne, but the skipper was observed there by Swengel and Swengel (1999) in annual surveys conducted from 1994-1997.

ESA Status and Other Organization Rankings

TNC / NHP G2 / 3; FS – Sensitive (R1)

The Powesheik skipper has no special status under the Endangered Species Act.

Habitat

The Powesheik skipper is considered an obligate resident of undisturbed prairie, particularly in the grass / wetland ecotone. Even small areas of such prairie are acceptable (Royer and Marrone 1992). Important habitats are composed of perennial forb, grass, and sedge components growing on saturated soils. These areas form the transition area between aquatic and upland sites (Swengel and Swengel 1999). Swengel and Swengel (1999) found the highest Powesheik skipper densities in relatively dry pastures with pockets of mesic prairie in the swales. The presence of a significant Asteraceae component is considered a requisite. Important nectar sources for adult skipperlings include purple coneflower, black-eyed susans, stiff-leaved coreopsis and white clover. On the Sheyenne National Grassland, acceptable habitats would occur in the "Lowland to Midland" landforms. Indicator plants of suitable habitat may include: Joe Pye weed, gayfeather, and spikerushes (Royer and Marrone 1992)

Spikerush is potentially an important larval host. The Powesheik skipper is frequently associated with areas that support regal fritillary, Dakota skipper, and Arogos skipper. It is also roughly synchronous and sympatric with these species.

Conservation Planning

A conservation strategy has not been prepared for this species, but Royer and Marrone (1992) completed a conservation assessment for North and South Dakota.

Moffat and McPhillips (1983) provide a general set of habitat management guidelines for butterflies in the northern Great Plains.

Direct and Indirect Effects on NFS Lands

Powesheik skippers could be impacted by several proposed activities, particularly grazing and burning (Swengel and Swengel 1999).

This species would be negatively impacted by any project which lowered groundwater levels.

Habitat invaded by woody and exotic vegetation losses much of its value to this skipper, but exotic vegetation control, particularly by herbicides, can also reduce habitat quality.

Use of insecticides also poses a threat to this skipper.

Powesheik skippers are particularly sensitive to burning, as all caterpillar stages are above ground (NatureServe 2000). The degree of threat depends on frequency of fire. In general, any area burned more than once per four years or any area burned as a single unit is unlikely to protect powesheik skippers (NatureServe 2000).

The species apparently tolerates mowing well (Swengel 1996).

Cumulative Effects

Many of the effects listed above are likely occurring on adjoining lands in this region and in the vicinity of these NFS lands.

Additional threats to the species on private lands across the planning area are the continuing conversion of native grasslands to cropland (USDA Forest Service 2000, Ostlie et al. 1997, Chuluun et al. 1997), broadscale insecticide applications (Arenz and Joern 1996, Ostlie et al. 1997), and use of grasslands for hay production.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in the revised LRMPs (Alternative 3):

Unit-wide Direction (Chapter 1)

SNG

- Modify livestock grazing during drought to reduce impacts to habitat (Standard).
- Manage for native forb abundance and diversity (Guideline).
- Delay mowing until July 15 or later (Guideline).
- Numerous standards and guidelines provide for enhanced management and protection of wetlands.
- Maintain hydrological regimes and protect and restore developed springs and seeps (Guideline).
- Design vegetation management and pesticide application projects to reduce mortality and to maintain nectar and larvae host plants (Guideline).
- Do not authorize vegetation management and construction projects that would further isolate populations or prevent recolonization (Standard).
- Prohibit use of pesticides that would adversely affect species at risk (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

SNG

- The objectives to provide specified amounts of ungrazed and high structure grasslands on this area are summarized in Table H-5 and H-6 in Section 5 of this document.
- Emphasize late fall mowing instead of prescribed burning at historic or known sites with Dakota skipper. (Guidline)
- Rest areas with historic or known populations of sensitive skippers (Guideline).
- Conduct butterfly and skipper surveys (Guideline).

Management Area Direction (Chapter 3)

SNG (MA 3.66)

- Initiate intensive restoration efforts to meet desired conditions that include active and passive methods (Guideline).
- Native reseeding project may be initiated with local seed sources (Guideline).

Monitoring Direction (Chapter 4)

SNG

- Continue monitoring populations and habitats.

Appendices

SNG

- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.
- The orchid recovery strategy described in Appendix N will also result in habitat improvement and enhancement for this skipper.

Biological Determinations, Risk Assessments, and Rationale

SNG

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Outcome VI is selected as the risk assessment for this species on and near the national grassland. Implementation of the orchid recovery strategy will also benefit this species. The rationale is that the management direction under Alternative 3 results in adjustments in livestock grazing intensities, introduction of rest pastures (particularly in butterfly areas), and added emphasis on restoring native vegetation. These actions will improve habitat conditions for the species. It's acknowledged that it may take two or more decades to restore much of the tallgrass prairie on this national grassland. This is partially due to invasive exotic plant species like smooth brome that are difficult to control. The rationale for the selection of Outcome VI is the relative lack of native grasslands in this region (Chuluun et al. 1997). This reduces the likelihood that other populations would be available to recolonize

populations that might be lost on the national grassland as a result of a natural event. Also, a successful reintroduction of this species has not been demonstrated.

Ottoe Skipper (*Hesperia ottoe*)

Royer and Marrone (1992), Dana (1991), and Opler et al. (1995) which is available on the Northern Prairie Wildlife Research Center website (www.npwrc.usgs.gov) were consulted as primary references for this species.

Species Description

The Ottoe (or Prairie) skipper is a moderate-sized butterfly with a wingspan of approximately 1.5 inches. It displays the hooked antennae typical of skippers, and has a characteristic rapid, skipping flight. The wings of the male are dark orange on the dorsum, and light orange on the ventrum. The female is darker brown above and grayer below (Royer and Marrone 1992).

After hatching, young larvae move to a host plant and build an elevated silk shelter, leaving only to feed at night (Klassen et al. 1989). Larvae feed on grasses, particularly little bluestem (Royer 1996). Larvae overwinter as fourth instar, and resume feeding the following spring. Adults emerge from pupal stage in mid-June in eastern North Dakota. Like others in the skipper family, adults are diurnal and feed on nectar of selected forbs. Mating occurs shortly after emergence. The main flight of adults lasts from June into August. Females oviposit on grasses and forbs (Dana 1991).

Distribution and Status

The Ottoe skipper occurs in southern Michigan, Illinois, and Wisconsin, and from westren Minnesota west to eastern Montana and south to Colorado and Texas (NatureSreve 2000), as well as in portions of Canada.

Table H-6 summarizes species occurrence and status in the planning area. This species is known to occur on the Little Missouri National Grassland and may be possible of occurring on the Grand River / Cedar River, Fort Pierre, Buffalo Gap, and Oglala National Grasslands and on the Nebraska and Samuel R. McKelvie National Forests. The species has not been found on the Sheyenne National Grassland (Opler et al. 1995).

Populations of this species are generally small and localized.

Organization Rankings

This species is listed as sensitive in Forest Service Region 1. The International Network of Natural Heritage programs and Conservation Data Centeres, has assigned the Ottoe skipper a rank of G3, meaning “vulnerable”. The national ranking for the United States (N3), is similar.

Habitat

This is a species of undisturbed open mid-grass to tallgrass prairie. Drier prairie sites may be favored. Favored nectar plants include blazing star, hoary vervain, and purple coneflower.

Conservation Planning

Moffat and McPhillips (1983) provide a general set of habitat management guidelines for butterflies in the northern Great Plains. Dana (1991) developed management guidelines for a reserve in southwest Minnesota. Royer and Marrone (1992) prepared a conservatoin assessment on this species for North and South Dakota.

Direct and Indirect Effects on NFS Lands

The Ottoe skipper is unusually sensitive to land management (Royer and Marrone 1992). Prescribed grazing, burning, and mowing can all help maintain prairie habitat, but each method also carries risks to Ottoe skippers (NatureServe 2000). Areas grazed by livestock are typically not used by this skipper. Mortality rates from prescribed burning are influenced by date (with early spring burning being less impactive) and fuel loads (burns of low-fuel areas are less impactive) (Dana 1991). Conversely, fire-suppression, as well as any other managment that results in few flowering forbs, can also threaten this species (NatureServe 2000). The primary benefits of fire are reduction of excessive litter, enhanced nutritional quality of grass, ameliorated larval microclimate, and enhanced forb flowering (NatureServe 2000).

Habitat that is invaded by exotics, such as brome grass, leafy spurge, and (to some extent), bluegrass, are soon degraded (Royer and Marrone 1992). Conversely, pesticide use, even herbicides used to treat exotics, can result in direct mortality and loss of forbs. Pesticides for insect control could result in mortality of non-target insect populations (Arenz and Joern 1996, Otlie et al. 1997).

Cumulative Effects

Because of this species low vagility, the cumulative effects area considered was relatively small, and coincided with the administrative boundaries of relevent planning units. Additional threats to the species on circumscribed non-NFS lands are the conversion of native grasslands to cropland and tame grasslands used for hay production (Finch 1991, Ostlie et al. 1997, USDA Forest Service 2000) and pesticide application projects (Arenz and Joern 1996, Ostlie et al. 1997).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

Dana (1991; cited in NatureServe 2000) offered the following recommendations relevant to the types of management proposed in this document:

- Maintain healthy prairie using fire as the primary tool.
- To keep fuel loads low, prescribed burns should occur every third season.
- Divide sites into several managment units, and burn them in rotation.
- Use grazing and mowing along with fire to manage for healthy prairie.

The following conservation measures are presented as management direction in the revised LRMPs (Alternative 3):

Unit-wide Direction (Chapter 1)

LMNG, GRCRNG, FPNG, BGNG, ONG, NNF (PRRD), NNF (BRD), SRMNF

- Do not authorize vegetation management and construction projects that would further isolate populations (Standard).
- Design vegetation management and pesticide application projects to reduce mortality and to maintain nectar and larvae host plants (Guideline).
- Manage for native forb abundance and diversity to provide foraging habitat for big game, grassland birds, and other grassland wildlife (Guideline).
- Restrictions on use of insecticides provide added protection to the species (Guideline).

LMNG, GR/CRNG

- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

LMNG, GR/CRNG, FPNG, BGNG, ONG, NNF (PRRD), NNF (BRD), SRMNF

- The objectives to provide specified amounts of ungrazed and high structure grasslands on these areas are summarized in Table H-5 and H-6 in Section 5 of this document.
- Prescribed burning objectives are established for each geographic area on each national grasssland and forest.

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

LMNG, GR/CRNG, FPNG, BGNG, ONG, NNF (PRRD), NNF (BRD), SRMNF

- Monitor populations and habitats.

Appendices

LMNG, GR/CRNG, FPNG, BGNG, ONG, NNF (PRRD), NNF (BRD), SRM

- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments and Rationale

LMNG

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Under this alternative, adjustments in livestock grazing intensities, introduction of rest pastures, use of surveys before prescribed burning, and added emphasis on restoring native vegetation should improve habitat conditions for this species. Restrictions on use of pesticides also provide added protection to the species. Outcome IV is selected as the risk assessment. . Under Alternative 3, ungrazed habitats will be available but significant gaps in the species historical distribution still remain and are permanent. Habitat enhancement will be needed help restore some populations in suitable habitats. Also, successful reintroductions of this species have not been demonstrated.

GR/CRNG

Determination is “no impact”. The species presence on these areas has not been confirmed and documented. However, management direction is provided for this species and potential habitat on this area. If the species presence had been confirmed, the determination would have been "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

FPNG, BGNG, ONG, NNF (PRRD), NNF (BRD), SRMNF

A biological determination or risk outcome are not given for this species on these areas because the species is not listed as sensitive in Region 2 of the Forest Service and because there are currently no known populations on or near these areas. However, management direction is provided for the species and potential and suitable habitat on these areas.

Regal Fritillary (*Spyeria idalia*)

Royer and Marrone (1992), Fritz 1997 and Opler et al. (1995) which is available on the Northern Prairie Wildlife Research Center website (www.npwrc.usgs.gov) were key references for this evaluation.

Species Description

This species is a very distinctive and large member of the brush-footed butterfly family (*Nymphalidae*). The wingspan is about 3-4”, with the dorsal surface orange and black.

Once this species hatches from its egg, the catepillar overwinters unfed. In spring, the catepillars feed on violets (Royer and Marrone 1992). Adult males emerge in early to mid-June and appear through early July. Females follow one to two weeks later, and continue into August. Eggs are laid near but not necessarily on violets. The species tends to widely disperse over large areas.

Distribution and Status

This species was once widely distributed in the northeastern and midwestern United States, but the range has declined drastically in recent decades. The regal fritillary is now found mostly in prairie remnants in the north-central plains.

Table H-3 summarizes this species' occurrence in the planning area. Regal fritillaries are known to occur on or near the Little Missouri (Royer 1195), Grand River / Cedar River, Sheyenne, and Fort Pierre National Grasslands and Nebraska National Forest (Bessey Ranger District). It may possibly occur on the Buffalo Gap and Oglala National Grasslands, Nebraska National Forest (Pine Ridge Ranger District) and Samuel R. McKelvie National Forest.

ESA Status and Other Organization Rankings

TNC / NHP G3; FS – Sensitive (R1 and R2)

The species has no status under ESA.

Habitat

The species is most commonly associated with tallgrass to mixed grass / bluestem prairies. Preferred habitats include big and little bluestem, western wheatgrass, and green needlegrass, with a variety of Asteracea species that serve as nectar sources for adults (e.g. milkweeds, purple prairie coneflower, pale coneflower, prairie coneflower, white prairie-clover, harebell, fleabane, blanket flower, and coneflower). Swampy and subirrigated meadows are also used by adults (Arnett 1997, Fritz 1997). Other nectar sources for adults include *Asclepias* spp., *Cirsium* spp., *Monarda* spp., and *Liatris* spp. Larvae feed only on species of violets. The principle requirement in all habitats appears to be the presence of extensive grasslands with high densities of violet and other nectar sources (Royer and Marrone 1992). Because violets are short statured and rapidly displaced by tallgrass species, some form of disturbance is needed.

Conservation Planning

A conservation strategy has not been prepared. However, recommendations are provided in Royer and Marrone (1992).

Moffat and McPhillips (1983) provide a general set of habitat management guidelines for butterflies in the northern Great Plains.

Direct and Indirect Effects on NFS Lands

Projects that lower groundwater levels could negatively impact this species and its habitat.

Grasshopper spraying on rangelands could negatively impact this species, depending on timing.

Invasion of native grassland communities by woody plants and exotic vegetation could reduce native plant species vital to this butterfly.

Prescribed burns can kill adults and larvae. Livestock grazing can reduce habitat suitability for this species, though light livestock grazing can benefit the species (Moffat and McPhillips 1983).

Mowing can reduce habitat suitability for this species, particularly if done early.

Cumulative Effects

Many of the effects listed above are likely occurring on adjoining lands in this region and near these NFS lands.

Additional threats to the species on private lands across the planning area are the continuing conversion of native grasslands to cropland, broad-scale insecticide applications (Arenz and Joern 1996, Ostlie et al. 1997), and use of grasslands for hay production (USDA Forest Service 2000, Ostlie et al. 1997, Chuluun et al. 1997).

Careful use of herbicides to control exotic invasive plant species can help enhance habitat management for this species.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in the revised LRMPs (Alternative 3):

Unit-wide Direction (Chapter 1)

LMNG, GRCRNG, SNG, BGNG, FPNG, ONG, NNF (PRRD), NNF (BRD), SRMNF

- Modify livestock grazing during drought to reduce impacts to habitat (Standard).
- Manage for native forb abundance and diversity (Guideline).
- Delay mowing until July 15 or later (Guideline).
- Numerous standards and guidelines provide for enhanced management and protection of wetlands.
- Maintain hydrological regimes and protect and restore developed springs and seeps (Guideline).
- Design vegetation management and pesticide application projects to reduce mortality and to maintain nectar and larvae host plants (Guideline).
- Do not authorize vegetation management and construction projects that would further isolate populations or prevent recolonization (Standard).
- Prohibit use of pesticides that would adversely affect species at risk (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

LMNG, GRCRNG, SNG, BGNG, FPNG, NNF (BRD), SRMNF

- Numerous objectives, standards and guidelines call for the use of rest and a variety of livestock grazing intensities to create an enhanced mosaic of vegetation composition and structure conditions across the landscape (see Section 5 of this document).

SNG

- Emphasize late fall mowing instead of prescribed burning at historic or known sites with Dakota skipper (Guideline).
- Rest areas with historic or known populations of sensitive skippers (Guideline).
- Conduct butterfly and skipper surveys (Guideline).

Management Area Direction (Chapter 3)

LMNG, GRCRNG, SNG, BGNG, FPNG, NNF (BRD), SRMNF

- Numerous areas with special biological resources have been allocated to management areas (MA 2.1, 2.2 and 3.64) that emphasize management of these special resources. Many of these allocations will focus interest and management on rare butterflies and skippers in these areas including the regal fritillary

SNG

- Approximately 63,760 acres of this national grassland is allocated to "ecosystem restoration" (MA 3.66). These areas are to be managed to restore and maintain native plant and animal species and communities and ecological processes and functions for tallgrass prairie and oak savanna.
- Regal fritillary butterflies are found in the proposed 240 acre Fritillary Prairie RNA and the proposed 370 acre Platanthera Prairie RNA. RNAs will be managed to protect their ecological values. Management plans will be completed within 5 years.

Monitoring Direction (Chapter 4)

LMNG, GRCRNG, SNG, BGNG, FPNG, ONG, NNF (PRRD), NNF (BRD), SRMNF

- Continue monitoring of populations and habitats. This includes continued monitoring of potential and suitable habitat on the Nebraska National Forest (PRRD) and Oglala National Grassland.

Appendices

LMNG, GRCRNG, SNG, BGNG, FPNG, ONG, NNF (PRRD), NNF (BRD), SRMNF

- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

LMNG, GRCRNG, FPNG, NNF (BRD)

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Outcome II is selected as the risk assessment for this species on and near these areas. Habitats near these units are less fragmented and more continuous (Chuluun et al. 1997) than those near the Sheyenne National Grassland.

SNG

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Under this alternative, adjustments in livestock grazing intensities, introduction of rest pastures, use of surveys before prescribed burning, limits of insecticide spraying and added emphasis on restoring native vegetation should improve habitat conditions for this species and reduce mortality risks. Outcome IV is selected as the risk assessment for this species on and near the Sheyenne National Grassland. The rationale is that habitat conditions will begin improving on this national grassland under Alternative 3. It's acknowledged that it may take two or more decades to restore much of tallgrass prairie on this unit due to several factors including invasive exotic plant species like smooth brome. The primary viability concern is the relative scarcity of native grasslands in this region (Chuluun et al. 1997), however this species has reasonably good dispersal capabilities (Debinski and Drobney 2000) and may still have the capability to recolonize vacant habitats on this area.

BGNG, ONG, NNF (PRRD), SRMNF

Determination is "no impact". The species presence on these areas has not been confirmed and documented. However, management direction is provided for this species and potential habitat on these areas. If the species presence had been confirmed, the determination would have been "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Sturgeon Chub (*Macrohybopsis gelida*)

The sturgeon chub status report (Werdon 1993) and the 90-day administrative finding report by the U.S. Fish and Wildlife Service (U.S. Fish and Wildlife Service 1994) were key references for this evaluation.

Species Description

The sturgeon chub is a slender minnow with small eyes, a small horizontal mouth, and low ridges or keels along the sides and back. It is unique within the Cyprinidae family in having keeled scales. Adults typically range in size from 50 to 70 mm, with maximum sizes near 100 mm. It is presumed to be a benthic taste feeder and is highly specialized for swift and turbid water (Lee et al. 1980). It has small, conical barbels at the corners of its mouth and a long, somewhat flattened snout that projects far beyond the upper lip (Pflieger 1978). Sturgeon chub mature reproductively at 2 years of age, and it is thought that they spawn in deep water in swift current (Botrell et al. 1964).

Distribution and Status

Table H-3 summarizes sturgeon chub distribution in the planning area. In South Dakota, it is found in the Missouri River, White River, Cheyenne River, and Grand River (Bailey and Allum 1962 cited in Lee et al. 1980). The Buffalo Gap and Fort Pierre National Grasslands are within the immediate watersheds of these rivers. More current surveys indicate it is still in portions of the Cheyenne and White Rivers and several tributaries of those rivers (G. Cunningham personal communication, U.S. Fish and Wildlife Service 1993, Hampton and Berry 1997, Fryda and Berry unpublished data). Current information on the presence of the species in the Grand River is lacking.

Sturgeon chub have recently been reintroduced into the Little Missouri River in North Dakota near the Little Missouri National Grassland, but the success of this effort is unknown at this time. The species was considered widely distributed in the Little Missouri River in the late 1970s (Reigh 1978 and Reigh and Owen 1979, cited in Kelsh 1993). However, Kelsh (1993) did not document this species on 24 sampling stations along the Little Missouri between Marmarth and Medora. Other later surveys of the Little Missouri River (Peterka 1993) also failed to document sturgeon chub in this river system. Kelsh (1993) hypothesizes that the extended droughts of the 1980s may have resulted in the extirpation of sturgeon chub from this system.

Historically, the sturgeon chub occurred throughout 2,300 miles of the mainstem Missouri River and 1,150 miles of the mainstem Mississippi River. The species also was found in the Yellowstone River in Montana and 24 tributaries of the Yellowstone or main stem Missouri River throughout the basin. The sturgeon chub occurred in portions of four tributaries in Wyoming, eight in Montana, seven in North Dakota, four in South Dakota, eight in Nebraska, and four in Kansas. The species currently occupies about 935 miles or 40% of its former range in the Missouri River; however, only 705 miles or 30% of its range supports stable populations. Like the sicklefin chub, populations of the sturgeon chub in the Mississippi River are very low and primarily found in 12%of its former range in a 140-mile reach of the river from St. Louis, Missouri, downstream to Grand Tower, Illinois. The species continues to be found in the Yellowstone River but likely has been extirpated from 21 of 24 (88%) former tributary habitats throughout its range. When considering the loss of tributary habitats, it is estimated that the sturgeon chub now occupies about 20% of its total historical range.

The present status of the sturgeon chub mirrors that of the sicklefin chub in the upper Missouri River Basin and the lower Missouri River in Missouri where populations are considered stable but low in numbers. Unlike the sicklefin chub, however, the upper basin populations are confined to several large tributaries and a smaller reach of the Missouri River.

This species is considered extirpated from the mainstem reservoirs and river reaches from the headwaters of Lake Sakakawea near Williston, North Dakota, to Sioux City, Iowa, and is close to extirpation in the channelized Missouri River in Iowa and Nebraska. The species also is extirpated from many of the large, braided channel Great Plains tributaries west of the Missouri River. Except for very low populations in the lower Platte River, the species does not occur in formerly occupied Kansas and Nebraska tributary rivers. Furthermore, it does not occur in any historical tributaries in the upper Missouri River basin except for the Powder River in Wyoming and Montana, the Yellowstone River in North Dakota and Montana, and the White and Cheyenne Rivers in South Dakota. The species also is now found near the mouths of Crazy Woman Creek in Wyoming and the Little White River and Bear-in-the-Lodge Creek in South

Dakota, tributaries to currently occupied historical habitats. Current information on the presence of the species in the Grand River in South Dakota is lacking.

The sturgeon chub was historically found in the Mississippi and Missouri River drainages, extending from Louisiana, northwest into Montana and Wyoming. It is now extirpated from 23 of 27 tributaries where it occurred historically (Werdon 1993). The species is still documented in the Yellowstone River in Montana.

ESA Status and Other Organization Rankings

FWS Candidate; TNC / NHP G2 N2; FS Sensitive (R1)

Habitat

Sturgeon chub are associated with medium to large Great Plains rivers. Sturgeon chub appear to be turbid water specialists that live primarily over gravel in the current of turbid, silty, and free-flowing rivers (Baxter and Simon 1970, Pflieger 1978). Turbid water adaptations for this species include small eyes and external taste buds abundantly developed overhead, body, and fins. The taste buds are probably of primary importance in locating food. The feeding habits of the sturgeon chub have not been studied (Baxter and Simon 1970). The function of the keels on the scales is unknown, but they may act as current detectors for orientation (Pflieger 1978).

Conservation Planning

A conservation strategy has not been prepared for this species.

Direct and Indirect Effects on NFS Lands

Small impoundments may modify hydrological flow patterns, especially during droughts, and reduce downstream flow. Flow reductions could make isolated populations more vulnerable to extirpation during droughts.

Stocking of piscivorous game fish could also threaten disjunct and isolated sturgeon chub populations. This problem is probably further exacerbated by the reduced sturgeon chub stock or lack of stock for recolonizing areas of local extinction.

Toxic spills into rivers and streams could also threaten local populations

Cumulative Effects

Aquatic resources and habitats in the planning area are some of the most fragmented and altered within North America (Abell 2000). In this area, major river impoundments are one of the primary threats to aquatic resources and to this species (Johnson 1998, Ostlie et al. 1997). Agricultural water uses may affect water availability in streams and rivers during drought. Pollution and toxic spills from industry and agriculture alters water quality, reduces habitat suitability, and / or poisons aquatic life (Johnson 1998, Ostlie et al. 1997).

Sand and gravel extraction operations have restricted fish movements and destroyed habitat.

Stocking of piscivorous game fish could also threaten disjunct and isolated sturgeon chub populations. This problem is probably further exacerbated by the reduced sturgeon chub stock or lack of stock for recolonizing areas of local extinction.

Interrelated and Interdependent Actions

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development. Site-specific biological assessments and evaluations are conducted at the time applications to permit drilling are considered by the Forest Service and potential effects on sturgeon chub populations in the project area would be addressed at that time.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in the revised LRMP (Alternative 3):

Unit-wide Direction (Chapter 1)

BGNG

- Manage land treatments to conserve site moisture and to protect long-term stream, wetland, and riparian area health (Standard).
- Allow only those actions next to perennial and intermittent streams, seeps, springs, lakes, and wetlands that maintain or improve long-term proper functioning of riparian ecosystem conditions (Standard).
- Locate activities and facilities away from riparian areas unless alternatives have been assessed and determined to be more environmentally damaging (Guideline).
- Design and construct all stream crossing and other in-stream structures to provide for sufficient passage of flow and sediment, withstand expected flood flows, and allow free movement of aquatic life (Standard).
- When possible, restore intermittent streams to continually flowing perennial streams (Guideline).
- Design and construct facilities to minimize the risk of accidental spills and discharge of petroleum and other materials into waters occupied by sensitive fish species (Standard).
- Do not authorize uses that would deplete instream flows below levels needed to protect sturgeon chub and sensitive fish habitat (Standard).
- Manage livestock grazing to maintain or improve riparian areas (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

BGNG

- Continue surveys in Cheyenne and White Rivers to establish baseline population and distribution information (Objective).
- Assess the potential impacts of construction of additional small impoundments in upper watersheds on hydrologic flow and downstream sturgeon chub habitat (Objective).

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

BGNG

- Continue monitoring populations and habitat.

Biological Determinations, Risk Assessments, and Rationale

BGNG (Cheyenne and White Rivers and tributaries)

No biological determination is made for this species on these areas because the species is not listed as sensitive in Region 2 of the Forest Service. However, management direction is provided for this species and its habitat in these areas.

Outcome II is selected as the risk assessment for this species in these two rivers and tributaries. The rationale is that added safeguards and considerations are being focused on the species and adverse reductions in water flow resulting from future Forest Service management actions are unlikely. Also, recent surveys in both rivers indicate that sturgeon chub seemed to be well-distributed along these rivers (Hampton and Berry 1997, Fryda and Berry unpublished data). For example, along the reach of the Cheyenne River from Angustora Reservoir to the Missouri River, sturgeon chub were found in 5 of 9 sampled reaches. In the White River, sturgeon chub were found in all but one sampled reach. However, it needs to be recognized that the Forest Service is a minor player in the upper watersheds of the Cheyenne and White Rivers. Many other factors and forces have a much greater influence on the species, and this includes major projects like the Angustora irrigation project. Selection of Outcome II assumes that factors beyond the authority of the Forest Service don't become major additional threats in the future.

Swift Fox (*Vulpes velox*)

The swift fox conservation assessment and conservation strategy (Kahn et al. 1997), Joslin and Youmans (1999), and the 12-month administrative findings report by the U.S. Fish and Wildlife Service were key references for this evaluation.

Species Description

The swift fox is a small canid with a black-tipped tail. Winter pelage is dark buffy gray above with orange-tan sides and legs and during the summer, the coat is shorter and more reddish. The species differs from the kit fox in that it has smaller ears, broader snout, and a shorter tail (see Nowak 1991). Swift fox are considered endemic residents of grassland prairies on the Great Plains, while kit fox occupy the more desert environments further south (Kahn et al. 1997).

They are monestrous and apparently monogamous and form pairs in early winter. Pairs may last for years and may be for life with breeding occurring in late winter. Gestation lasts 7-8 weeks, and there's one litter per year. In Oklahoma, most litters are born in March or early April. Litter size usually is 3-6 (Egoscue 1979). Pups first emerge from den at about 1 month in late May and early June. Young are tended by both sexes and disperse in late summer or early fall.

Dispersal of young begins in September and August. Dispersal distances average approximately 7 miles (11 km), with an observed maximum distance of approximately 40 miles (64 km) (Mercure et al. 1993). Density of a locally abundant population in Wyoming was reported as one pair per 2 to 4 square miles (5-8 km^2) (Clark and Stromberg 1987).

Swift fox use dens year-round to protect themselves from predators and the weather and either excavate their own dens or enlarge burrows of other animals.

Distribution and Status

Table H-3 summarizes occurrence in the planning area. Populations occur on and near Thunder Basin, Buffalo Gap, and Oglala National Grasslands. Forest Service maps of occupied swift fox habitat on NFS lands were reviewed for this evaluation.

Current swift fox distribution is still relatively widespread in the planning area and includes portions of South Dakota, Wyoming, and Nebraska. Swift fox are apparently absent from North Dakota although several recent observations suggest the species may exist at extremely low densities in the southwestern counties. In Wyoming, swift fox occupy much of their historical range, although surveys in some counties are incomplete. Swift fox are known to occur in very limited numbers in the panhandle and southwestern Nebraska. Distributions and associated densities appear highly variable.

Recent accounts suggest that the swift fox may be increasing and reoccupying some portions of their historic range. The swift fox was originally found in central plains of North America, from southern Alberta and Saskatchewan south to northern Texas. The present range is now much restricted and the species exists in highly disjunct populations. Extirpated in Canada (1978 COSEWIC report), recent reintroductions have resulted in a wild population of approximately 150 animals in two release areas. The viability of this population is questionable. The swift fox occupies 20-30% of its historic range.

ESA Status and Other Organizational Rankings

TNC / NHP G3, N3; FS Sensitive (R1 and R2)

This swift fox was petitioned for listing under ESA in 1992. The 90-day finding from U.S. Fish and Wildlife Service concluded that a species listing may be warranted range-wide. The 12-month finding issued in 1995 by the U.S. Fish and Wildlife Service resulted in a "warranted, but precluded decision," concluding that the magnitude of threats to the species is low to moderate although the immediacy of threats remains imminent. The recent candidate status of the swift fox was dropped in January 2001.

Habitat

Swift fox appear to be habitat generalists and occupy a variety of shrubland and grassland types. Habitats commonly include intermittent and permanent water sources during most years. They seem to prefer areas where grassland structural characteristics are varied and diverse (Uresk and Javersak, in press). The species also occurs in predominately agricultural landscapes and appear to be very adaptive to these unnatural habitats. There is a tendency for swift fox to prefer level to moderately rolling terrain that affords good visibility for detecting other predators, such as coyotes and golden eagles (Hillman and Sharps 1978, Hines 1980).

They are opportunistic feeders taking a variety of prey and carrion. Small mammals including black-tailed prairie dogs, northern pocket gophers and thirteen-lined ground squirrels made up most of their summer diet in South Dakota (Uresk and Sharps 1986); small birds, grasshoppers, beetles, grass and prickly pear cactus comprised the rest. Swift fox are commonly observed hunting roadsides, presumably in search of carrion. The species caches excess food under snow in winter.

The swift fox inhabits open prairie and arid plains, including areas intermixed with winter wheat fields. The species occupies burrows when inactive and may dig burrows or use burrows made by other mammals (prairie dog, badger), usually in sandy soil on high ground (e.g. hill top, Pruss 1999) in open prairies, along fencerows, and occasionally in plowed fields. Individuals may use several different dens throughout year.

Young are born in an underground den about 3 ft (1 m) below ground surface (Banfield 1974). Dens usually have multiple entrances. Slight disturbances may cause females to move young to different dens.

Conservation Planning

A swift fox conservation assessment and conservation strategy has been prepared (Kahn et al. 1997). A Canadian recovery plan calls for extensive reintroductions and the conservation of prairie habitats.

Direct and Indirect Effects on NFS Lands

Mortality can result from collisions with automobiles (Egoscue 1979, Sovada et al. 1998, Black et al. 1998).

Swift fox are easily shot, trapped, and poisoned and therefore are susceptible to mortality from predator control (Uresk and Sharps 1986). Use of M-44s by government animal damage control agents could result in accidental swift fox mortality.

Prairie dog poisoning on NFS lands could reduce prey availability, especially during winter when many other prey species are unavailable. Swift fox may be more vulnerable to coyotes and other predators when they hunt fewer and smaller prairie dog colonies.

Disturbances, traffic risks, and habitat loss could result from oil and gas development.

Coal production can result in the loss of occupied and potential swift fox habitat. Under Alternative 3, 47,990 acres are designated for mineral production and development (MA 8.4) on the Thunder Basin National Grassland. Coal production and reclamation is regulated by other state and federal agencies. The Office of Surface Mining is the federal agency with responsibility for approving mining plans. The state of Wyoming has delegated primacy for approval of mining and reclamation plans to the Wyoming Department of Environmental Quality. Forest Service reviews mining and reclamation plans to determine compliance with LRMP direction. Mining and reclamation plans also require consultation with the U.S. Fish and Wildlife Service.

Cumulative Effects

Predator control on private lands to reduce livestock losses may result in accidental swift fox mortality. In some areas, predator control on private lands may have an indirect effect of

enhancing swift fox populations by reducing overall coyote populations, thereby reducing predation on swift fox.

Elimination of prairie dog towns on private lands may hinder swift fox expansion and recovery.

Risks to swift fox could occur where the new proposed railroad corridor crosses private and state lands.

Disturbances, traffic risks, and habitat loss could result from oil and gas development on other land jurisdictions.

Although construction of the new proposed railroad corridor (Powder River Basin Expansion Project) could result in additional sources of carrion for swift fox, it could also result in increased risks of swift fox being struck by trains and service vehicles on the Thunder Basin and Buffalo Gap National Grasslands.

Interrelated and Interdependent Actions

Oil and gas exploration and development activities, unless carefully managed, can result in habitat loss, risks, and adverse disturbances to swift fox. Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development. Although the decision to make areas available for oil and gas leasing does not result in on-the-ground activities and possible effects on mountain plover, oil and gas stipulations to protect and conserve plovers and their habitat are needed at the time leasing availability decisions are made. Site-specific biological assessments and evaluations are also conducted at the time applications to permit drilling are considered by the Forest Service. The number of new wells predicted in the reasonable and foreseeable development analysis for the national grasslands known to currently support swift fox and have moderate to high oil and gas potential is as follows:

	Oil and Gas Wells	Coalbed Methane Wells
BGNG	85	0
ONG	15	0
TBNG	140-230	600

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. Livestock grazing permittees or grazing associations commonly request predator control and poisoning on NFS lands to reduce livestock losses. Although there may be overall benefit to swift fox populations by reduced coyote or red fox populations, risks to individual swift fox can occur depending on the predator control methods.

Conservation Measures and Mitigation

The U.S. conservation strategy (Kahn et al. 1997) calls for the following:

- Development of a survey protocol to monitor trends in the distribution and population status of swift fox throughout the species range.
- Define what constitutes suitable swift fox habitat within various geophysiographic regions and identify components of swift fox habitat.
- Implementation of habitat and population management practices on state and federal lands that emphasize the conservation of swift fox.

Conservation Measures and Mitigation, cont.

- Reestablishment of local populations in unoccupied suitable habitat, with initial emphasis in the northern portion of the species range.
- Periodic monitoring of genetic diversity and species health.

The following conservation measures are presented as management direction in the revised LRMPs (Alternative 3):

Unit-wide Direction (Chapter 1)

BGNG, ONG, TBNG

- Reduce disturbances to swift fox within 0.25 miles of natal dens from March 1 to August 31 (Standard).
- Prohibit use of M-44s in occupied swift fox habitat (Standard).
- Manage for a mosaic of grassland structure conditions (Guideline).
- Numerous objectives, standards and guidelines to increase prairie dog populations and colony size.
- Identify key habitats on national grasslands (Guideline).
- Increase and expand distribution of swift fox on national grasslands (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

BGNG, ONG, TBNG

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).
- Numerous objectives, standards and guidelines to increase prairie dog populations and colony size.
- Use predator control methods that do not pose a significant and direct mortality risk to swift fox (Standard).

Management Area Direction (Chapter 3)

BGNG

- A 9,540 acre special plant and wildlife habitat area (MA 3.64) is established for swift fox
- management. Providing sufficient and secure habitat for swift fox is the management priority in this area. This area supports what is believed to be the largest swift fox population in South Dakota.

Monitoring Direction (Chapter 4)

BGNG, ONG, TBNG

- Continue monitoring populations and habitat.
- Monitor the effectiveness of oil and gas stipulations for protecting this species and its habitat.
- Monitor the effectiveness of the suggested stocking rates in Appendix I in meeting the desired vegetation composition and structure objectives.

Appendices

BGNG, ONG, TBNG

- Apply oil and gas stipulations (see Appendix D in revised LRMPs) for swift fox.
- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

TBNG, BGNG, ONG

Determination is "may adversely impact individuals but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Outcome II is selected as the risk assessment for this species on these areas. The **r**ationale is the added protection to reduce disturbances near natal den areas and the expansion of prairie dog populations. Restrictions on the use of M44s in occupied swift fox habitat also reduce risks to individual swift fox. The added emphasis on creating a more diverse grassland landscape by managing for a mosaic of structural stages should also benefit swift fox (Uresk and Javersak, in press).

It is possible that plague epizootics could reduce prairie dog populations in the future but swift fox populations have been observed to remain viable over long periods in the absence of prairie dogs. However, the ability of swift fox to achieve higher densities in areas with large prairie dog populations is not disputed.

Black-tailed Prairie Dog (*Cynomys ludovicianus*)

Hoogland (1995), Jones et al. (1983), Van Pelt (1999) and the 12-month administrative findings report for the petition to list the black-tailed prairie dog as a threatened species (U.S. Fish and Wildlife Service 1999) were primary references consulted during this evaluation.

Species Description

Black-tailed prairie dogs are diurnal, burrowing rodents that live in densely populated colonies on North American grasslands and shrublands. Densities ranging from 3 to 18 prairie dogs per acre have been documented in South Dakota (Cincotta 1985, Hoogland 1995). This species is monoestrus and typical litter size, when young first emerge from their natal burrows, ranges from 1 to 6 with an average of approximately 3 (Hoogland 1995). Prairie dogs eat a variety of

plant material and their diets vary depending on local plant species composition (Fagerstone 1981). They seem to prefer grasses including western wheatgrass, blue grama, and buffalograss. Forbs and various plant parts including roots are also consumed. They also clip vegetation to maintain visibility. Long-term colonization of a site frequently results in a reduction in grasses and an increase in forbs and bare ground (Coppock et al. 1983, Archer et al. 1987), and colonies frequently expand to fill adjoining suitable habitat. Some yearling prairie dogs will normally disperse in May or June to other colonies or to establish new colonies. Dispersal distances up to 6.2 mi (10 km) have been documented (Knowles 1985).

Distribution and Status

Table H-6 summarizes species occurrence and status in the planning area. Maps of prairie dog colonies maintained by the Forest Service were reviewed for this evaluation, as was information on the distribution of existing prairie dog colonies within the planning area (Sidle et al. in press, Sidle 1999).

Black-tailed prairie dog colonies now cover about 800,000 acres in the United States, Canada, and Mexico, and this represents an overall reduction in colony acreage since European settlement of North America of greater than 90% (Knowles 1998, Mulhern and Knowles 1997, Ostlie et al. 1997, Biggins and Godbey 1995, Northern Great Plains Terrestrial Assessment).

ESA Status and Other Organizational Rankings

ESA Candidate; TNC / NHP G3, N3; FS Sensitive Species (R1 and R2)

The species was petitioned in 1998 for listing as a threatened species by several conservation organizations. The U.S. Fish and Wildlife Service found the listing was warranted but precluded by higher listing priorities. The species was given candidate status.

Habitat

This species occurs mostly on shortgrass and mixed grass prairie on the Great Plains. Some populations are also found in the Nebraska Sandhills. Suitability of habitats for this species is enhanced by low vegetative cover and increased visibility to detect predators. Because of this, these animals prefer areas with disturbed soils and / or grasslands grazed by cattle or bison. They can also modify shrublands to meet their needs by cutting down individual shrubs from the perimeter of their colonies. They typically colonize grasslands of a wide variety of soil types and that are flat to gently rolling. They avoid wetlands and areas with high water tables. Hoogland (1995), Jones et al. (1983), Knowles (1982), and Clippenger (1989) were consulted for additional information on the habitat relationships of this species.

The active prairie dog colony acreage on each national grassland and forest determined from surveys conducted between 1996 and 1998 is as follows:

Table H-4. Acres of Active Prairie Dog Colonies.

National Grassland or Forest	Current Colony Acreage	Current Number of Colonies
LMNG	2,860	149
SNG	NA	NA
GR/CRNG	1,520	37
FPNG	720	42
BGNG	13,280	296
ONG	740	9
NNF (BRD)	70	8
NNF (PRRD)	NA	NA
SRMNF	NA	NA
TBNG	18,340	146

These acreages presented above have undoubtedly increased on most of the planning units since these surveys were conducted.

The number of colonies and their size on each national grassland and forest based on the 1996-98 surveys are as follows:

Table H-5. Number and Size of Prairie Dog Colonies (1996-1998).

National Grassland or Forest	Total Number of Colonies	1-24 Acres		25-49 Acres		50-99 Acres		100+ Acres	
LMNG	149	113	76%	18	12%	9	6%	9	6%
SNG	NA								
GR/CRNG	19	9	47%	5	26%	0	0%	5	26%
FPNG	42	33	79%	6	14%	1	2%	2	5%
BGNG	232	133	57%	44	19%	27	12%	28	12%
ONG	9	4	44%	1	11%	2	22%	2	22%
NNF (BRD)	8	8	100%		0%		0%		0%
NNF (PRRD)	NA								
SRMNF	NA								
TBNG	124	47	38%	17	14%	26	21%	34	27%

Conservation Planning

Statewide or regional habitat conservation strategies involving federal, state, county, and tribal agencies and other interested organizations have not been prepared. However, preparation of state-wide conservation strategies is currently underway in each state within the planning area.

The Commission for Environmental Cooperation (2000) suggested the possibility of developing an international North American conservation strategy.

Direct and Indirect Effects on NFS Lands

Prairie dog poisoning reduces or eliminates prairie dog populations.

Livestock grazing and its affects on vegetation can be managed to either help contain or increase prairie dog colony acreages.

Ground-disturbing activities associated with development of impoundments, rangeland ripping and pitting, pipelines, oil and gas, and other construction activities can enhance habitat suitability for prairie dogs.

Prairie dogs are popular targets for many recreational shooters. However, empirical data, resulting from controlled experiments, that document significant reductions in prairie dog populations, as a result of recreational shooting, are limited at this time. As a minimum, it's suspected that recreational shooting of prairie dogs can significantly reduce prairie dog densities and indefinitely maintain reduced densities in smaller isolated colonies. Shooting prairie dogs in colonies that have been previously poisoned could likely prevent or slow population recovery in those colonies.

Roadless designation and wilderness proposals would likely reduce recreational shooting of prairie dogs in those areas.

Coal production can result in the loss of occupied and suitable prairie dog habitat. Under Alternative 3, 47,990 acres are designated for mineral production and development (MA 8.4) on the Thunder Basin National Grassland. Coal production and reclamation is regulated by other state and federal agencies. The Office of Surface Mining is the federal agency with responsibility for approving mining plans. The state of Wyoming has delegated primacy for approval of mining and reclamation plans to the Wyoming Department of Environmental Quality. Forest Service reviews mining and reclamation plans to determine compliance with LRMP direction. Mining and reclamation plans also require consultation with the U.S. Fish and Wildlife Service.

Cumulative Effects

Across the Great Plains, approximately 55% of all prairie dog colonies occur on private and state lands (Mulhern and Knowles 1997). It's likely that reductions in prairie dog populations on private lands within the planning area through poisoning, loss of habitat (cultivation), and shooting will continue. Poisoning on federal lands including public domain land, national parks and national wildlife refuges has been substantially reduced primarily to situations involving human health and safety.

Some states within the planning area are currently considering possible closed seasons on prairie dog shooting during part of the year to enhance reproduction and survival of young prairie dogs.

Plague, an exotic disease that's highly lethal to prairie dogs, is a serious threat to the persistence of local and possibly regional black-tailed prairie dog populations. Currently, plague epizootics periodically occur across approximately 66%of the black-tailed prairie dog range (Commission on Environmental Cooperation 2000).

Approximately 40% of the private rangelands on the northern prairie (71 million acres) are in poor to fair range condition and this indicates a loss of higher successional plant communities (Natural Resources Conservation Service 1996). Flat to rolling shortgrass and mixed grass prairies in these conditions provide suitable habitats for black-tailed prairie dogs.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. Livestock grazing permittees or grazing associations commonly request prairie dog poisoning on NFS lands to reduce forage consumption and clipping by prairie dogs.

Conservation Measures

The following conservation measures are presented as management direction in the revised LRMPs (Alternative 3):

Unit-wide Direction (Chapter 1)

LMNG, GRCRNG, FPNG, BGNG, ONG, NNF (BRD), TBNG

- Prohibit activities that would flood burrows (Standard).
- Limit use of rodenticides to reduce prairie dog populations to situations involving public health and safety and damage to private and public facilities (Standard)..
- Do not use burrow fumigants (Standard).
- Consult state-wide prairie dog conservation strategies for additional guidance on the appropriate response to complaints of unwanted prairie dogs on adjoining agricultural lands (Guideline).
- In consultation with state wildlife agencies, restrict prairie dog shooting where shooting is preventing or slowing a desired prairie dog population expansion (Guideline).
- Conduct an active landownership adjustment plan to reduce conflicts with adjoining landowners over prairie dog management (Guideline).
- Align new roads outside prairie dog colonies or minimize road construction within colonies (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat, including prairie dog colonies, for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

LMNG, GRCRNG, FPNG, BGNG, ONG, NNF (BRD), TBNG

- Numerous objectives, standards and guidelines provide for increased prairie dog populations and for establishment of new colony complexes. The predicted acreages of prairie dog colonies in 10 years under the management direction in Alternative 3 are as follows:

National Grassland or Forest	Predicted Colony Acreage in 10 Years
LMNG	5,400 to 9,400
SNG	NA
GR/CRNG	2,500 to 3,900
FPNG	1,200 to 1,900
BGNG	22,000 to 36,000
ONG	1,200 to 1,900
NNF (BRD)	Unknown
NNF (PRRD)	NA
SRMNF	NA
TBNG	30,000-48,000

- The predicted acreages in 10 years were derived from a prairie dog expansion model. The lower end of the ranges is expected if normal or above normal precipitation patterns prevail over the next 10 years. If drought conditions prevail and vegetation conditions are conducive to colony expansion and establishment, the upper end of the ranges is expected.
- The objectives to provide specified amounts of early seral and low structure grasslands on these areas are summarized in the tables in Section 5 of this document.

Management Area Direction (Chapter 3)

LMNG, BGNG, ONG, TBNG

- Expansion and protection of prairie dog populations in black-footed ferret reintroduction habitat (MA3.63). Details on current and predicted prairie dog populations in these areas are presented in the black-footed ferret assessment in this document.

TBNG

- Cheyenne River Zoological Special Interest Area (MA 2.1b) is established with standards to expand prairie dog populations and to reduce disturbances from management activities and other land uses. This area is 5,980 acres in size (see MA 2.1b for management details in the revised LRMP).

Monitoring Direction (Chapter 4)

LMNG, GR/CRNG, FPNG, BGNG, ONG, NNF (BRD), TBNG

- Continue monitoring populations and habitat.

Appendices

LMNG, GR/CRNG, FPNG, BGNG, ONG, NNF (BRD), TBNG

- Appendix H provides a description of quality habitat for this species. This appendix is referenced by a standard under unit-wide direction (Chapter 1) to provide quality habitat for this species.
- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

GR/CRNG, FPNG, BGNG, ONG

A determination of "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide" is concluded for the prairie dog populations on each national grassland under the revised LRMPs. Outcome II is selected as the risk assessment for this species on these areas. The rationale is that Alternative 3 provides for the expansion and establishment of at least one colony complex on each national grassland, and prairie dog populations on each of these areas are expected to expand. This assumes that all or most rangelands supporting prairie dog colonies will continue to be grazed by livestock, thereby retaining high habitat suitability levels for prairie dogs. In addition, livestock grazing will be increased in some areas to accelerate expansion. Additional restrictions on poisoning and possible restrictions on shooting will also result in expanded prairie dog populations. Re-colonization of any inactive colonies would likely occur without reintroductions. However, reintroductions may be used in some areas to accelerate prairie dog colony expansion.

LMNG, TBNG

A determination of "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide" is concluded for the prairie dog populations on these national grasslands under the revised LRMP. Outcome II is selected as the risk assessment for this species on these areas. The rationale is that Alternative 3 provides for expansion of prairie dog populations. This assumes that all or most rangelands supporting prairie dog colonies will continue to be grazed by livestock, thereby retaining high habitat suitability levels for prairie dogs. Additional restrictions on poisoning and possible restrictions on shooting could also result in expanded prairie dog populations. Re-colonization of any inactive colonies would likely occur without reintroductions. If plague epizootics become problematic in the future on these areas, Outcome III may be a more appropriate selection.

NNF (BRD)

A determination of "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide" is concluded for the prairie dog populations on this area. However, Outcome V is selected as the risk assessment for this species on this area. The rationale is that the prairie dog colonies are protected under Alternative 3, but because habitat capability is marginal for prairie dogs in this area of the Nebraska Sandhills, long-term viability is still questionable. Also, it is possible that prairie dog reintroductions may be necessary to recover inactive colonies; two colonies that have been inactive for several years still have not recolonized.

Section 4. Biological Evaluation for Species that are at Risk Regionally or at State Levels

These species are listed as sensitive by the Forest Service and / or classified as threatened or endangered under state law. They are all ranked as G4 (apparently secure globally) or G5 (secure globally) by the Natural Heritage Program. Some of the species may have local populations within the planning area or on NFS lands that may be at risk of being extirpated. The distribution of these plant and animal species is shown in the following table.

Table H-6. Species at Risk Regionally or at State Levels.

Species	National Grassland or Forest										
	Classification	**LMNG**	**GRCRNG**	**SNG**	**TBNG**	**BGNG**	**FPNG**	**ONG**	**NNF PRRD**	**NNF BRD**	**SRMNF**
Labrador bedstraw	FS – Sensitive (R1)			K							
Marsh bellflower	FS – Sensitive (R1)			K						P	K
Buckbean	FS – Sensitive (R1) IA - Threatened			K							
Nodding buckwheat	FS – Sensitive (R1)	K			P	P		P			
Slender cottongrass	FS – Sensitive (R1)			K						P	P
Lanceleaf cottonwood	FS – Sensitive (R1)	K			P	P					
Torrey's cryptantha	FS – Sensitive (R1)	K			P						
Dogberry	FS – Sensitive (R1)			K							
Crested shield fern	FS – Sensitive (R1)			K						P	P
Marsh fern	FS – Sensitive (R1)			K						P	K
Oak fern	FS –Sensitive (R1) IA - Threatened			K	UQ						
Sensitive fern	FS – Sensitive (R1)			K						P	K
Leathery grape-fern	FS – Sensitive (R1)			K							
Little grape-fern	FS – Sensitive (R1)			K							
Spinulose woodfern	FS – Sensitive (R1)			K						P	K
Northern lady-fern	FS – Sensitive (R1)			K							
Shining flatsedge	FS – Sensitive (R1)			K	UQ					P	P
Umbrella flatsedge	FS – Sensitive (R1)			K						P	P
Frostweed	FS – Sensitive (R1)			K	UQ					P	P
Broad-leaved goldenrod	FS – Sensitive (R1)			K							
Beach heather	FS – Sensitive (R1)			K							
Marsh horsetail	FS – Sensitive (R1)			K							
Meadow horsetail	FS – Sensitive (R1)			K							
Sand lily	FS – Sensitive (R1)	K	P		P	P		P	P	P	P
Blue lips	FS – Sensitive (R1)	K			P	P		P			
Alyssum-leaf phlox	FS – Sensitive (R1)	K	P		P	P		P	P		
Limber pine	FS – Sensitive (R1)	K									
Upright pinweed	FS – Sensitive (R1)	P		K						P	P

Species	National Grassland or Forest										
	Classification	**LMNG**	**GRCRNG**	**SNG**	**TBNG**	**BGNG**	**FPNG**	**ONG**	**NNF PRRD**	**NNF BRD**	**SRMNF**
Alkali sacaton	FS – Sensitive (R1)	K	P		P	P		P			
Purple sandgrass	FS – Sensitive (R1) MN - Spp Concern			K						P	P
Delicate sedge	FS – Sensitive (R1) IA - Spp Concern			K							
Foxtail sedge	FS – Sensitive (R1)			K							
Handsome sedge	FS – Sensitive (R1)			K							
Showy lady's slipper	FS – Sensitive (R1) IA - Threatened			K							
Small white lady's slipper	FS – Sensitive (R1) IA, MN - Spp Concern COSEWIC - E			K						P	P
Wahoo spindle-tree	FS – Sensitive (R1)			K							
Golden stickleaf	FS – Sensitive (R1)	K									
Adder's tongue	FS – Sensitive (R1) IA - Spp Concern			K						P	K
Hooker's townsendia	FS – Sensitive (R1)	K			P	K		P			
Loesel's twayblade	FS – Sensitive (R1)			K						P	K
Bog willow	FS – Sensitive (R1) IA - Threatened			K							
Belfragii's bug	FS – Sensitive (R1)	K	P	K							
Tawny crescent butterfly	FS – Sensitive (R1 & 2)	K	P		P			P	K		
Arogos skipper	FS – Sensitive (R1)		P	P	P	P	P	P			
Flathead chub	FS – Sensitive (R2)	K/OS	K/OS		K/OS	K/OS		K/OS		K/OS	K/OS
Longnose sucker	SD - Threatened	K/OS									
Plains topminnow	FS – Sensitive (R2)				K/OS	K/OS				K/OS	K/OS
Northern leopard frog	FS – Sensitive (R1 & 2) MT - Spp Concern COSEWIC - V	K	K	K	K	K	K	K	K	K	K
Tiger salamander	FS – Sensitive (R2)	K	K	K	K	K	K	K	K	K	K
Pale milk snake	FS – Sensitive (R2) MT - Spp Concern	P	P		P	P	P	P	K	K	P
Blanding's turtle	IUCN - Lower Risk SD - Endangered									P	K

Species	National Grassland or Forest									
	Classification	**LMNG**	**GRCRNG**	**SNG**	**TBNG**	**BGNG**	**FPNG**	**ONG**	**NNF PRRD**	**NNF BRD**	**SRMNF**
American bittern	FS – Sensitive (R2) PIF - Moderate Priority WY - Spp Concern Priority	K	K	K		K	K	K		P	K
Greater prairie chicken	FS – Sensitive (R1 & 2) MN - Spp Concern COSEWIC - XT			K			K			K	K
Yellow-billed cuckoo	FS – Sensitive (R2) PIF - Moderate Priority MT, WY - Spp Concern	UQ	K	K	K	K	UQ	K	K	K	K
Long-billed curlew	FS – Sensitive (R2) BLM - Sensitive COSEWIC - V WY - Spp Concern PIF - High Priority WY-PIF - Level 1	K	P		K	K	K	K		K	K
American peregrine falcon	FS – Sensitive (R1 & 2) TNC / NHP – G4T4, N3 MT,NE,SD–Endangered WY – Spp Concern	K	P	P	K	K	K	K	K	P	P
Northern goshawk	FS – Sensitive (R1 & 2) BLM - Sensitive MT, WY - Spp Concern	P	P	P	K	P	P	P	P	P	P
Sage grouse	FS – Sensitive (R1) WY-PIF - Level 1 COSEWIC - E	K			K	K					
Ferruginous hawk	FS – Sensitive (R2) BLM - Sensitive COSEWIC - V MT, WY - Spp Concern WY-PIF - Level 1	K	K		K	K	K	K	K	K	K
White-faced ibis	FS – Sensitive (R2) BLM - Sensitive MT, WY - Spp Concern			P	P	UQ	UQ	UQ			UQ

Species	National Grassland or Forest										
	Classification	**LMNG**	**GRCRNG**	**SNG**	**TBNG**	**BGNG**	**FPNG**	**ONG**	**NNF PRRD**	**NNF BRD**	**SRMNF**
Common loon	FS – Sensitive (R2) BLM - Sensitive				UQ	UQ	UQ	UQ		UQ	UQ
Merlin	FS – Sensitive (R2) WY - Spp Concern	K	P	P	K	K	K	K	K	K	K
Pygmy nuthatch	FS – Sensitive (R2)				P			P	K		
Western burrowing owl	FS – Sensitive (R1 & 2) BLM - Sensitive COSEWIC - E MT - Spp Concern MN - Endangered WY-PIF - Level 1	K	K	P	K	K	K	K	K	K	K
Sprague's pipit	FS – Sensitive (R1)	K	K	P	K	K	P			P	P
Upland sandpiper	FS – Sensitive (R2)	K	K	K	K	K	K	K	K	K	K
Loggerhead shrike	FS – Sensitive (R1 & 2) BLM - Sensitive COSEWIC - T MT - Spp Concern PIF - Moderate Priority MN - Threatened WY-PIF - Level 1	K	K	K	K	K	K	K	K	K	K
Baird's sparrow	FS – Sensitive (R1 & 2) BLM - Sensitive MT - Spp Concern PIF - High Priority MN - Endangered WY-PIF - Level 1	K	K	P	K	UQ	P	UQ			
Fox sparrow	FS – Sensitive (R2)	P	P	P	K	P	K	P	P	K	K
Trumpeter swan	IUCN - Lower Risk FS – Sensitive (R2) BLM - Sensitive MT,WY - Spp Concern WY-PIF - Level 1					K					UQ

Species	National Grassland or Forest									
	Classification	**LMNG**	**GRCRNG**	**SNG**	**TBNG**	**BGNG**	**FPNG**	**ONG**	**NNF PRRD**	**NNF BRD**	**SRMNF**
Black tern	FS – Sensitive (R2) BLM - Sensitive PIF - Moderate Priority IA - Spp Concern WY-PIF - Level 1	K	K	K	K	K	K	P		P	P
Black-backed woodpecker	FS – Sensitive (R1 & 2) BLM – Sensitive WY – Spp Concern				P						
Lewis' woodpecker	FS – Sensitive (R2)				K	P		K	K		
Townsend's big-eared bat	IUCN - Vulnerable FS – Sensitive (R1 & 2) BLM - Sensitive MT,WY - Spp Concern	P			K	K		P	P		
Mountain lion	SD - Threatened	P			K	P		P	K		
Fringe-tailed myotis	WY - Spp Concern FS – Sensitive (R2)				K	K		K	K		
River otter	NE - Endangered SD - Threatened	K		K						P	P
California bighorn sheep	FS – Sensitive (R1)	K									
Dwarf shrew	FS – Sensitive (R2) MT, WY - Spp Concern				UQ	UQ					

K = Known occurrence in vicinity; date of last observation indicates that species still occurs in area,

P = Possible but unconfirmed occurrence,

UQ = Species occurrence is unlikely or questionable; within species range and potential habitat may occur,

OS = Possible off-site occurrence (downstream, etc.).

Species Eliminated From Further Analysis

Screen 1 (Importance of Area)

TBNG = Oak Fern (Gymnocarpium dryopteris), Shining Flatsedge (Cyperus bipartitus), Frostweed (Helianthemum bicknelli)

- Rationale: The occurrence of these species on this area has not been confirmed and documented. If the presence of one or more of these species is confirmed in the future, this biological evaluation will be revisited and revisions to management direction considered.

SNG, TBNG, BGNG, FPNG, ONG, SRMNF = White-faced Ibis (*Plegadis chihi*)

- Rationale: Observations of this species on these areas are extremely rare and incidental or have not documented. Breeding on these areas is unlikely and has not been confirmed and documented.

TBNG, BGNG, FPNG, ONG, NNF-BRD, SRMNF = Common Loon (*Gavia immer*)

- Rationale: Observations of this species on these areas are extremely rare and incidental or have not been documented. Breeding on these areas is highly unlikely.

BGNG, ONG = Baird's Sparrow (*Ammodramus bairdii*)

- Rationale: Observations of this species on these areas are rare or have not been documented. Breeding on these national grasslands is unlikely and has not been confirmed and documented. If breeding should be confirmed in the future, this biological evaluation will be revisited and revisions to management direction considered.

SRMNF = Trumpeter Swan (*Cygnus buccinator*)

- Rationale: Although some trumpeter swans winter along the Snake River just south of this national forest, none have been observed using wetlands habitats on this area. Nesting by the species has not been observed in wetlands habitats on the national forest. If nesting should be confirmed in the future, this biological evaluation will be revisited and revisions to management direction considered.

TBNG, BGNG = Dwarf Shrew (*Sorex nanus*)

- Rationale: Occurrence of this species on these national grasslands is questionable. If the presence of the species is confirmed in the future, this biological evaluation will be revisited and revisions to management direction considered.

LMNG, FPNG = Yellow-billed Cuckoo (*Coccyzus americanus*)

- Rationale: The presence of this species and suitable habitat are questionable. If breeding is confirmed in the future on or near this area, this biological evaluation will be revisited and revisions to management direction considered.

All Planning Units = American Peregrine Falcon (*Falco peregrinus*)

- Rationale: Occurrence of this species on or near the planning units is highly incidental, unpredictable and limited to migrants passing through these areas. Although an oil and gas stipulation is provided for possible future peregrine falcon nests (Romin and Muck 1999, Joslin and Youmans 1999, Richardson and Miller 1997) on the Little Missouri National Grassland, potential and suitable nesting habitat on this area or on the other national grasslands and forests within the planning area either does not exist or is negligible.

All Planning Units except TBNG = Northern Goshawk (*Accipiter gentilis*)

- Rationale: Occurrence of this species on or near the planning units is highly incidental, unpredictable, and currently limited to migrants passing through these areas. If breeding is confirmed in the future on or near these areas, this biological evaluation will be revisited and revisions to management direction considered.

Screen 2 (Threats)

All Planning Units = Tiger Salamander (*Ambystoma tigrinum*)

- Rationale: It is highly unlikely that land use activities and allocations under Alternative 3 would significantly affect the species and / or its habitat. Under Alternative 3, no significant changes in the amount or distribution of wetlands are prescribed. Local adult and larvae populations of this species appear to be largely determined by annual climatic conditions (precipitation) (Larson et al. 1998).

All Planning Units = Pale Milk Snake (*Lampropeltis triangulum*)

- Rationale: It is highly unlikely that land use activities and allocations under Alternative 3 would significantly affect the species and / or its habitat. This species appears to occupy a wide range of habitats (Luce et al. 1997) and spends considerable time underground or under rocks and logs. They are occasionally killed on roadways but this likely has an insignificant effect on local populations (Walter Deptula, personal communication).

LMNG, TBNG, BGNG, ONG, NNF-PRRD = Townsend's Big-eared Bat (*Corynorhinus townsendii*)

- Rationale: It is highly unlikely that land use activities and allocations under Alternative 3 would significantly affect the species and / or its habitat. Most of these units do not have open mine shafts that provide habitat for this species, and management activities and recreation seldom occur or are minimal in habitats that provide natural caves (badlands formations) for the species.

LMNG, SNG, NNF (BRD), SRMNF = River Otter (*Lutra canadensis*)

- Rationale: It's highly unlikely that any activities or allocations authorized by the Forest Service could cause adverse effects on the species or its habitat.

Screens 1 and 2

LMNG, TBNG, BGNG, ONG, NNF-PRRD = Mountain Lion (*Felis concolor*)

- Rationale: Lion use of most of these areas can best be described as incidental, and factors largely beyond the control or authority of the Forest Service determine their populations and use of these areas.

The following species that are classified as sensitive by the Bureau of Land Management were also dropped from further detailed analysis. None of the species were listed under ESA as threatened, endangered, proposed or candidate, and none met the Forest Service criteria for sensitive species classification. Also, none were listed as endangered or threatened within the planning area under state law.

- Meadow jumping mouse (*Zapus hudsonius*),
- Merriam's shrew (*Sorex merriami*),
- Hairy woodpecker (*Picoides villosus*),
- Le Conte's sparrow (*Ammodramus caudacutus*),
- Snapping turtle (*Chelydra serpentina*),
- Spiney softshell turtle (*Trionyx spiniferus*).

Evaluations for Individual Species

Upright Pinweed (*Lechea stricta*)

Species Description

This perennial canescent forb blooms early to mid season depending on location and weather conditions. The plant is erect, densely branched above, scarcely woody, and has small, crowded leaves (Stevens 1963, Great Plains Flora Association 1986). Flowers are greenish in dense, slender, terminal clusters. Fruit is a capsule with small seeds. It is a member of the Cistaceae family.

Distribution and Status

Distribution of this species includes New York and Ontario, west to North Dakota, and south to Ohio, Indiana, Illinois, and Nebraska (Great Plains Flora Association 1986). Within the planning area, upright pinweed is known from two populations in North Dakota (North Dakota Natural Heritage database 2000) and two populations in Nebraska (Great Plains Flora Association 1977). In addition, a recently discovered population was found in the Hecla Sand Hills of north central South Dakota on private land (Dave Ode, South Dakota Heritage Program, personal communication). In North Dakota, one of the populations is found in Richland County on the Sheyenne National Grassland. This population is large, containing approximately 4000 individuals concentrated within 1/10 of an acre. The other population in North Dakota is known from a historical record on private land in western North Dakota, Bowman County. The populations in Nebraska are both located on private land.

Table H-6 summarizes species occurrence and status in the planning area. Upright pinweed is currently found on the Sheyenne National Grassland and may possibly occur on the Little Missouri National Grassland and the Nebraska and Samuel R. McKelvie National Forests.

Organization Rankings

Upright pinweed is classified as sensitive in Region 1 of the Forest Service. The species is ranked G4 globally, apparently secure although it may be quite rare in parts of its range.

The species is ranked as S1 in both North Dakota and Nebraska (NatureServe 2000). A S1 rank means a species is critically imperiled in the state because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because of some factor in its biology making it especially vulnerable to extinction.

Habitat

Upright pinweed is categorized as a mid-range of versatility species, being found associated primarily with one habitat type but may also be found in other habitat types across the tallgrass and mixed grass prairie. It is found in sandy habitats within the choppy sandhills of the tallgrass prairie on the Sheyenne National Grassland, but may also occur in sandy depressions on the mixed grass prairie in the western part of the planning area (North Dakota Natural Heritage Database 2000). Within the Northern Great Plains planning area, the habitat components associated with this species are uncommon and occupy a minor percentage of the total land base.

Upright pinweed prefers sandy soils, prairie meadows, and open prairie conditions (Great Plains Flora Association 1986, Barker et al. 1977, Stevens 1963). The large population on the Sheyenne National Grassland is found in the big bluestem / little bluestem habitat type. Soils for this population are fine sands with low organic matter.

Upright pinweed habitat on the tallgrass prairie on the Sheyenne National Grassland was traditionally dominated by grass species such as big bluestem (*Andropogon gerardi*), indiangrass (*Sorghastrum nutans*), and switchgrass (*Panicum virgatum*). These communities intergraded into mixed grass prairie on the Sheyenne National Grassland (Seiler 1973). Within these communities, the disturbance processes of herbivory, fire, and climatic fluctuations were significant determinants for plant distribution and community composition (Northern Great Plains Terrestrial Assessment 2000).

Conservation Planning

Statewide or regional habitat conservation strategies have not been developed for this species in the planning area.

Direct and Indirect Effects on NFS Lands

Noxious weeds such as leafy spurge occur throughout the tallgrass prairie. Noxious weeds reduce the quality of habitat but at the same time, efforts to control spurge and other invasive species with herbicides can pose a direct threat to upright pinweed.

Competition from non-native plants can be a significant threat to pinweed and its habitat. The currently known population on the Sheyenne National Grassland contains Kentucky bluegrass and sweet clover. Invasive species such as Kentucky bluegrass often form monocultures significantly reducing the diversity of native species.

Recreation can have negative effects on pinweed if recreation use increases the introduction or spread of invasive plant species into its habitat.

Roads can negatively affect upright pinweed by introducing non-native plant species along travel routes, by habitat fragmentation, and by loss of suitable habitat to disturbance.

Increased rates of channelization in drainages can result in lowered water tables. Any activities that lower water tables below the effective rooting zone of pinweed will place individuals or populations at risk.

Burning, livestock grazing, and mowing can have positive or negative effects on this species depending on frequency, intensity, and timing of disturbance and on the reproductive characteristics of upright pinweed. Properly timed burning, grazing, and mowing may be beneficial in maintaining the quality of native grassland habitats for pinweed. Lack of disturbance on the tallgrass prairie can cause some sites to convert to shrub habitats.

Burning may directly impact pinweed by causing mortality or indirectly impact the species through effects on its habitat. Burning improves the nutrient cycling within soils. However, summer burning may prevent completion of the life cycle for upright pinweed. Very early spring and late fall burning should have no effect on the species and may be beneficial.

Upright pinweed is not considered palatable to cattle but could be grazed by sheep or goats. Grazing can prevent upright pinweed from completing its life cycle and producing seeds. Excessive and continuous grazing can lead to impacts on plant regrowth, thereby reducing the vigor of plants within the population.

Grazing can also reduce dead material within plant communities and open up canopy layers of plants, allowing for the germination and establishment of new plants of upright pinweed.

Livestock trampling can be a problem to upright pinweed. Trampling can damage individual plants. In addition, excessive and repeated soil compaction from trampling may result in reduced plant vigor.

Repeated mowing may prevent upright pinweed from completing its life cycle and may also reduce carbohydrate reserves. Mowing should have no affect after seed set.

Cumulative Effects

Noxious weeds are likely to remain threats to the habitat of this species on private and public lands in and around the Sheyenne National Grassland (Ostlie et al. 1997).

Continued loss of suitable habitat through conversion of rangelands to croplands can be expected to occur on private lands (Chuluun et al. 1997, Ostlie et al. 1997, USDA Forest Service 2000).

Livestock grazing and mowing practices that are unfavorable for the conservation of sensitive plant species are likely to continue on some private lands.

Development activities such as road and building construction on private lands will continue, resulting in some loss of suitable habitat for sensitive plant species and some possible mortality of sensitive plants and population loss.

Drainage on adjacent private land may lower water table levels below the root zone of some sensitive plant species, putting individuals or populations at risk.

Insecticide spraying on adjacent croplands may reduce or threaten insect pollinators (Arenz and Joern 1996, Ostlie et al. 1997).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

In the western part of the planning area, decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD), eventual on-site development, and additional roads and pipelines.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction under Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

LMNG, SNG, NNF (BRD), SRNMF

- Avoid placing new facilities, roads, trails, fences, salting and minerals, and other developments in habitat (Guideline).
- Identify habitats as priority areas for noxious weed control (Guideline).
- Avoid the use of noxious weed and invasive plant control methods that may negatively impact populations (Guideline).
- Design timing, intensity, and frequency of mowing, burning, and livestock grazing to maintain or increase populations (Standard).
- Ensure that management actions do not contribute to loss of population viability (Standard).
- Protect known populations from land use activities that cause increased trampling or soil compaction (Guideline).
- Enhance and improve habitat for known populations through restoration programs (Guideline).

LMNG, SNG

- Require permits to collect sensitive plants or parts of sensitive plant species (Standard).
- Prohibit use of pesticides that would adversely affect species at risk (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

SNG

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).
- Develop and implement conservation strategy (Guideline).
- Conduct target plant surveys or baseline assessments (Guideline).

Management Area Direction (Chapter 3)

- None.

Monitoring Direction (Chapter 4)

LMNG, SNG, NNF (BRD), SRNMF

- Monitor populations and habitat

Biological Determinations, Risk Assessments, and Rationale

SNG

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." This determination is based on the habitat enhancement prescribed through the restoration of ecological processes to varying levels across the landscape. Alternative 3 will provide for increases in mid to higher seral conditions that should favor the mosaic of landscape habitat conditions across the Sheyenne National Grassland. The acres of rangeland annually rested from livestock grazing under Alternative 3 also more closely approximates the grazing conditions under which tallgrass prairie habitats evolved as compared to current grazing conditions (USDA Forest Service 2000). In addition, the level of prescribed fire under Alternative 3 is a step towards restoring the natural fire regime. Alternative 3 provides for no net increase (from current levels) of noxious weeds. The existence and spread of noxious and exotic species is one of the primary threats to the maintenance of high quality, tallgrass prairie habitat (USDA Forest Service 2000).

In addition, Alternative 3 provides for specific conservation and mitigation measures to be applied to upright pinweed including baseline population assessments, target surveys, and a conservation strategy.

Outcome VI is the selected risk assessment for this area under Alternative 3. Rationale for outcome VI is that upright pinweed is known from very limited populations in the vicinity of the planning unit. This will result in strong limitations on interactions among local populations, high potential for genetic isolation, and uncertainty about the species response to climatic stochastic. Threats to the species from management activities on the private land populations are also a consideration. The largest known population occurs on the Sheyenne National Grassland where habitat is threatened by serious competition from invasive and noxious weeds. Although habitats should be enhanced and the known population should receive adequate protection under Alternative 3, viability concerns remain because of the threats of invasive and noxious weeds and the degree of isolation.

LMNG

Determination is “no impact.” The species presence on this national grassland has not been confirmed and documented. However, management direction is provided for this species and potential habitat on these areas. If the species presence had been confirmed, the determination would have been "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

NNF (BRD), SRMNF

No determination is made because the species is not listed as sensitive in Region 2 of the Forest Service. Also, the species presence on these areas has not been confirmed and documented.

Handsome Sedge (*Carex formosa*)

Species Description

This perennial sedge is cespitose with short, tough rootstocks. The fruit is an achene, and fruiting occurs from early June to mid-July (Great Plains Flora Association 1986). It is a member of the Cyperaceae family.

Distribution and Status

This species is a rare inhabitant of mesic deciduous forests throughout its range, which is centered around the Great Lakes and extends from New England to North Dakota (Challey and Heidel 1993).

Table H-6 summarizes species occurrence and status in the planning area. In the planning area, handsome sedge is only known to occur in eastern North Dakota. There are no known occurrences in South Dakota (Dave Ode, South Dakota Heritage Program, personal communication). In North Dakota, the species is known from five element occurrence records, all located along the Sheyenne River valley in Richland County (North Dakota Natural Heritage database 2000). Of these populations, only one population is known from U.S. Forest Service lands where it occurs on the Sheyenne National Grassland. The population on the SNG represents the western-most extension of this species’ range. The North Dakota populations appear to be highly disjunct occurrences from the nearest known population in western Minnesota (Challey 1991, Lenz prof. knowledge).

Organization Rankings

The Global Conservation Status Rank of handsome sedge is G4 (NatureServe 2000). It is classified as a sensitive species in Region 1 of the Forest Service.

Handsome sedge is ranked as S1 in North Dakota, critically imperiled because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres), or because of some factor of its biology making it especially vulnerable to extirpation from the state (North Dakota Natural Heritage Inventory 1999).

At one time, this species was a candidate for listing as threatened and endangered (federal listing) because it appears to be rare with highly localized distribution throughout its range (Challey 1991).

Habitat

The species appears to be restricted to moist eastern deciduous woodlands on alluvial soils. Dominant vegetation includes green ash and aspen. The one known population on the Sheyenne National Grassland is found in the riverine wetlands complex, consisting of mesic areas resulting from upland drainage patterns of the Sheyenne River (North Dakota Natural Heritage Database 2000). Here it occurs on the river bottom near the base of north-facing bluffs along the river valley margin.

Habitat for this species in North Dakota has been fragmented by roads and agricultural activities (Challey 1991). Within the Northern Great Plains planning area, the greatest losses of riparian and wetland habitat since pre-settlement (by percentage) have occurred in North Dakota, with the most extensive drainage occurring to tallgrass prairie wetlands in eastern North Dakota (NGP Aquatic Assessment 1998).

Conservation Planning

Statewide or regional habitat conservation strategies have not been developed for this species in the planning area.

Direct and Indirect Effects on NFS Lands

Handsome sedge may be sensitive to grazing or trampling by livestock (USDA Forest Service 1991). Habitat occurs in areas that are typically very shaded. Livestock use these areas for shade in the heat of the summer, if accessible. In addition, excessive and repeated soil compaction from trampling may result in reduced plant vigor.

Livestock grazing can prevent handsome sedge from completing its life cycle and producing seeds. In addition, excessive and continuous livestock grazing can lead to impacts on plant regrowth, thereby reducing the vigor of plants within the population. This species may have moderate palatability to cattle. It is considered a grass-like plant and may be selected by livestock for forage.

Noxious weeds such as leafy spurge occur in scattered populations throughout the tallgrass prairie. Noxious weeds such as leafy spurge and Canada thistle reduce the quality of habitat for handsome sedge but at the same time, efforts to control spurge and other invasive species with chemicals can pose a direct threat to the species. In addition, many chemicals are restricted for use within riparian areas.

Competition from invasive, non-native plants can be a primary threat. Invasive species such as Kentucky bluegrass and smooth brome have the potential to compete with handsome sedge for habitat, significantly reducing population numbers. Encroachment by exotic woody species may also threaten species habitat.

Roads can negatively affect handsome sedge and known populations by introducing non-native plant species along travel routes, by habitat fragmentation, and by loss of suitable habitat to disturbance.

Recreational river use may increase in the species' habitat as users explore shorelines from the river. While this habitat is not conducive to camping due to its wet nature, soil compaction and trampling can occur. Recreational use can also increase the rate of spread of non-native plant species along recreational routes.

Increased rates of channelization in drainages can result in a lowered water table. Any activities that lower water tables below the effective rooting zone of handsome sedge will place individuals or populations at risk.

Cumulative Effects

Noxious weeds will likely remain a problem in the habitat of this species on private and public lands in and around the Sheyenne National Grassland (Ostlie et al. 1997).

Continued loss of suitable habitat through conversion of woodlands to croplands and draining of croplands can be expected to occur on private lands (USDA Forest Service 2000, Ostlie et al. 1997, Chuluun et al. 1997).

Livestock grazing practices that are unfavorable for the conservation of sensitive plant species are likely to continue on some private lands.

Development activities such as road and building construction on private lands will continue, resulting in some loss of suitable habitat for sensitive plant species and possible mortality of sensitive plants and population loss.

Drainage ditches and irrigation can alter the hydrologic regime of mesic habitats, inducing drier conditions to these habitats, preventing the plants from completing their life cycle, and / or killing the plants.

Interrelated and Interdependent Actions

Determining federal range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

SNG

- Avoid placing new facilities, roads, trails, fences, salting and minerals, and other developments in habitat (Guideline).
- Identify habitats as priority areas for noxious weed control (Guideline).
- Avoid the use of noxious weed and invasive plant control methods that may negatively impact populations (Guideline).
- Design timing, intensity, and frequency of mowing, burning, and livestock grazing to maintain or increase populations (Standard).
- Maintain hydrological regimes and protect and restore developed springs and seeps where habitat would be enhanced (Guideline).

SNG, cont.

- Ensure that management actions do not contribute to loss of population viability (Standard).
- Protect known populations from land use activities that cause increased trampling or soil compaction (Guideline).
- Enhance and improve habitat for known populations through restoration programs (Guideline).
- Require permits to collect sensitive plants or parts of sensitive plant species (Standard).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

SNG

- Develop and implement a conservation strategy (Guideline).
- Conduct target plant surveys or baseline assessments (Guideline).
- Protect habitat supporting the Eastern Prairie Boggy Wetland plant guild from livestock grazing (see tables in Section 5) (Guideline).
- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).
- Avoid use of goats or sheep for noxious weed control (Guideline).
- Avoid placing water developments, oilers, livestock salt, or mineral near or in Eastern Prairie Boggy Wetland guild (Guideline).
- Designate and sign recreation trails adjacent to or within habitats to encourage user to stay on trails (Guideline).
- Discourage recreation activities in occupied habitats (Guideline).
- Handsome sedge is found in MA 3.64 (1250 acres). Numerous standards and guidelines provide priority protection for species at risk.

Management Area Direction (Chapter 3)

SNG

Management Area 3.64 provides the following conservation measures:

- Limit all motorized use to administrative use (Standard).
- Protect wetland habitat to maintain hydrologic regimes (Standard).
- Maintain disturbance processes favorable to wildlife and plant species (Standard).
- Allow no new road or trail construction except when necessary to correct resource damage (Standard).
- Conflicts that cannot be mitigated are resolved in favor of plant and wildlife species (Standard).
- Prohibit removal of mineral material (Standard).

- Do not include this MA in any grazing allotment (Guideline).
- Locate new and re-locate existing recreation trails to prevent habitat damage (Standard).
- No new utility corridors or additional development within existing corridors will be permitted (Standard).

Monitoring Direction (Chapter 4)

SNG

- Monitor populations and habitat.

Biological Determinations, Risk Assessments, and Rationale

SNG

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Under this alternative, varying levels of habitat enhancement and restoration are proposed that should benefit the species. Natural processes such as rest can enhance riparian and wetland habitat. In addition, some of the proposed management activities should provide additional specific protection measures for the known population of the species.

The increased levels of prescribed fire are a positive step towards restoring the fire regime. Alternative 3 provides for no net increase (from current levels) of noxious weeds. The existence and spread of noxious and exotic species is one of the primary threats to the maintenance of high quality tallgrass prairie habitat (Northern Great Plains Terrestrial Assessment 2000).

Under Alternative 3, the known population of handsome sedge and its primary habitat are found under Management Area 3.64 (Special Plant and Wildlife Habitat) that provides several conservation measures that will benefit this species. In addition, Alternative 3 provides for specific conservation and mitigation measures to be applied to handsome sedge including baseline population assessments, target surveys, and a conservation strategy.

Under the management activities proposed, habitats should be enhanced for this species. The known population should receive adequate protection. Viability should be affected by proposed management throughout the planning unit and planning area.

Outcome VI is selected as the risk assessment under Alternative 3. Rationale for outcome VI is that handsome sedge is known from very limited populations within the planning area. This will result in strong limitations on interactions among local populations, high potential for genetic isolation, and uncertainty about the species response to climatic stochasticity. Threats to the species from management activities on the private land populations are also a consideration. On the Sheyenne National Grassland, habitat for handsome sedge is threatened by serious competition from invasive and noxious weeds. Alternative 3 provides for specific mitigation and conservation measures for this species, but because of its continued isolation and threats from invasive and noxious weeds, concerns over viability remain.

Belfragi's Chlorochroan Bug (*Chlorochroa belfragii*)

Species Description

Belfragi's bug (also known as Belfragi's chlorochroan bug or green stink bug) is a large, little-researched animal found in the north-central United States. Stink bugs are easily recognized by their shield-like shape and five –segmented antennae (U.S. Fish and Wildlife Service 1995). They are well known for their ability to produce a strong, disagreeable odor, which aids in their defense. The Belfragi's bug is elongate and about 0.5 inch long. Its overall color is green, with a distinct pale yellowish stripe along the midline of its back.

Distribution and Status

This species has been collected in Nebraska, South and North Dakota, Illinois, and Manitoba. As summarized in Table H-6, it occurs on or near the Sheyenne and Little Missouri National Grasslands and may also be present on the Grand River and Cedar River National Grasslands. The status of Belfragi's bug on the other national grasslands is unknown. Based on this species' habitat affiliations, populations have likely declined dramatically from historic conditions, but little is actually known.

Organization Rankings

The Belfragi's bug is classified as sensitive in Region 1 of the Forest Service. Very little is known of its current population levels, and so the species has not been assigned a ranking by the International Network of Natural Heritage programs and Conservation Data Centeres.

Habitat

Mesic prairie seems to be the primary habitat for this species (U.S. Fish and Wildlife Service 1995). Belfragi's bug likely feeds on grasses, particularly prairie cordgrass.

Conservation Planning

Statewide or regional habitat conservation strategies have not been prepared for this species.

Direct and Indirect Effects on NFS Lands

The proposed management activities that are most likely to impact Belfragi's bug are the use of insecticides and herbicides and livestock grazing.

Cumulative Effects

All of the activities listed above under direct and indirect effects are likely occurring on private lands as well, within the cumulative effects area of the administrative boundary of the Sheyenne, Little Missouri, Grand River, and Cedar River National Grasslands (Ostlie et al. 1997, USDA Forest Service 2000, Arenz and Joern 1996). In addition, water withdrawal on lands adjacent to the Sheyenne National Grassland may result in decreased mesic prairie available to the Belfragi's bug.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

LMNG, GR/CRNG, SNG

- Do not authorize vegetation management and construction projects that would further isolate populations (Standard).
- Design vegetation management and pesticide application projects to reduce mortality and to maintain nectar and larvae host plants (Guideline).
- Manage for native forb abundance and diversity to provide foraging habitat for big game, grassland birds, and other grassland wildlife (Guideline).
- Prohibit control of native insects until an evaluation of impacts to other resources is made (Guideline).
- Prohibit use of pesticides that would adversely affect species at risk (Guideline).

Geographic Area Direction (Chapter 2)

LMNG, GR/CRNG, SNG

Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral and vegetation structure (see tables in Section 5).

Management Area Direction (Chapter 3)

LMNG

- The 209-acre Burning Coal Vein / Columnar Junipers SIA provides habitat for this species. Livestock grazing is not allowed in this area (Standard).

Monitoring Direction (Chapter 4)

LMNG, GR/CRNG, SNG

- Monitor populations and habitat
- Monitor the effectiveness of the suggested stocking rates in Appendix I in meeting desired vegetation composition and grassland structure levels.

Appendices

LMNG, GR/CRNG, SNG

- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

SNG, LMNG

Proposed management activities have the potential to impact Belfragi's bug habitat, but little is known of this species' ecology. Because proposed activities would result in increased habitat diversity, increased ecological integrity, and (on the Sheyenne National Grassland) an increased focus on mesic prairie restoration, this species will likely benefit overall. Due to the potential adverse impacts of grazing and insecticide and herbicide use however, the following determination is made: "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

It was difficult to conduct a risk assessment for this species due to the lack of information on the species. However, based on its habitat associations and the management direction under Alternative 3, outcome IV was selected. The land surrounding the planning units generally offer refugia of undisturbed prairie, and while such refugia would be available under Alternative 3 as part of the proposed rest areas, the portions suitable to this species are likely to be small and isolated. Habitat enhancement will be needed to restore populations and recover the potential distribution of the species on the relevant planning units.

GR/CRNG

Determination is "no impact." The species presence on these areas has not been confirmed and documented. However, management direction is provided for this species and potential habitat on these areas. If the species presence had been confirmed, the determination would have been "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Tawny Crescent Butterfly (*Phyciodes batesii*)

Species Description

The tawny crescent is a medium-sized (1.5 inch wide) member of the brush-footed butterfly family (Nymphalidae). The upper surface of the wings is a complex pattern of dark orange and black. On the underside, the forewing has black patches, while the hind wing is clear yellow.

The subspecies *P. b. lakota,* which occurs in the planning area, is the focus of this account. Adults mate in June and lay egg clusters on the underside of aster leaves. Larvae overwinter as third (Royer and Marrone 1992) or fourth (NatureServe 2000) instars, and then pupate the following June to emerge as adults. Dogbane and spurge are favored nectar sources for adults.

Distribution and Status

The tawny crescent occurs from central Alberta east to central Ontario and southern Quebec, south into North Dakota, Minnesota, Wisconsin, Michigan, and Pennslyvania, as well as further south in the Applachian Mountains to northern Georgia, and through the Rocky Mountain States to Arizona. Isolated populations are also found in the Black Hills and the Nebraska Pine Ridge (NatureServe 2000).

Table H-6 summarizes species occurrence and status in the planning area. The species is known to occur on the Little Missouri National Grassland and the Nebraska National Forest (Pine Ridge). It may possibly occur on the Grand / Cedar River, Thunder Basin and Oglala National Grasslands.

Declines from historic conditions are likely related to habitat loss and degradation. Subspecies *P. b. batesii* has declined greatly, and may go extinct. Since the reasons for this precipitous decline is largely unexplained, there is no assurance that *P. b. lakota* will not decline in the future as well (NatureServe 2000).

Organization Rankings

This species is classified as sensitive in Regions 1 and 2 of the Forest Service. The tawny crescent butterfly has a global conservation status rank of G4, meaning "apparently secure."

Habitat

The subspecies *P. b. lakota* uses a variety of open dry habitats, like oak savannahs, pine barrens, ponderosa pine savannas, and aspen parkland (NatureServe 2000, Fritz 1997). Typical habitat in North Dakota is moist clearings in natural aspen stands or green ash woodlands. In western North Dakota, it is found on north-facing slopes and other mesic sites (Royer and Marrone 1992). It was recently found in riparian drainages within ponderosa pine forest on the Nebraska National Forest (Fritz 1997). There appears to be a strong association in North Dakota between tawny crescents and green ash forest margins that border bluestem prairie. As mentioned above, aster serves as larvae hosts, and dogbane and spurge are favored nectar sources for adults.

Conservation Planning

A conservation strategy has not been prepared. However, Moffat and McPhillips (1983) provide a general set of habitat management guidelines for butterflies in the northern Great Plains. Royer and Marrone (1992) prepared a conservation status report for this species in North and South Dakota.

Direct and Indirect Effects on NFS Lands

Projects that lower groundwater levels could negatively impact this species and its habitat.

Herbicide treatments to control leafy spurge reduce nectar sources.

Grasshopper spraying on rangelands could negatively impact this species.

Prescribed burns can kill adults and larvae.

Livestock grazing can reduce habitat suitability for this species, especially where riparian and other wetland sites are degraded. Light livestock grazing can also be used to help maintain suitable prairie habitat for butterflys (Swengel and Swengel 1995).

Intensive mowing and haying can cause direct mortality and reduce habitat suitability for this species (Swengel and Swengel 1995).

Cumulative Effects

Because of this species low vagility, the cumulative effects area considered was relatively small, and coincided with the administrative boundaries of relevant planning units. Additional threats to the species on circumscribed non-NFS lands are the conversion of native grasslands to cropland and hay production (Finch 1991, Ostlie et al. 1997, USDA Forest Service 2000, Arenz and Joern 1996).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

Royer and Marrone (1992) provided recommendations to federal land management agencies. These included: 1) limit grazing in tawny crescent habitat, particularly along wooded margins, and 2) protect, maintain and enhance spring and stream flows. Moffat and McPhillips (1983) suggested:

- Maintain and enhance spring and stream flows.
- Before constructing roads alongside a riparian area, conduct a clearance survey.
- Limit leafy spurge control in drainages to targeted, non-chemical means.
- Enhance nectar sources and larval host plants.

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

LMNG, GR/CRNG, ONG, NNF (PRRD), TBNG

- Do not authorize vegetation management and construction projects that would further isolate butterfly populations (Standard).
- Design vegetation management and pesticide application projects to reduce mortality and to maintain nectar and larvae host plants (Guideline).
- Manage land treatments to conserve site moisture and to protect long-term stream, wetland, and riparian area health (Standard).
- Allow only those actions next to perennial and intermittent streams, seeps, springs, lakes, and wetlands that maintain or improve long-term proper functioning of riparian ecosystem conditions (Standard).
- Design activities to protect and manage the riparian ecosystem (Standard).

- Locate activities and facilities away from riparian areas unless alternatives have been assessed and determined to be more environmentally damaging (Guideline).
- Design and construct all stream crossing and other in-stream structures to provide for sufficient passage of flow and sediment, withstand expected flood flows, and allow free movement of aquatic life (Standard).
- When possible, restore intermittent streams to continually flowing perennial streams (Guideline).
- Manage livestock grazing to maintain or improve riparian areas (Guideline).
- Manage for native forb abundance and diversity to provide foraging habitat for big game, grassland birds, and other grassland wildlife (Guideline).
- Prohibit control of native insects until an evaluation of impacts to other resources is made (Guideline).
- Prohibit use of pesticides that would adversely affect species at risk (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

LMNG, GR/CRNG, ONG, NNF (PRRD), TBNG

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).

Management Area Direction (Chapter 3)

LMNG

- Habitat for this species may possibly occur in the proposed 5,880-acre Cottonwood Creek Badlands RNA. RNAs will be managed to protect their ecological values. Management plans will be completed within 5 years.

Monitoring Direction (Chapter 4)

LMNG, GR/CRNG, ONG, NNF (PRRD), TBNG

- Monitor populations and habitat.
- Monitor the effectiveness of the suggested stocking rates in Appendix I in meeting desired vegetation composition and grassland structure levels.

Appendices

LMNG, GR/CRNG, ONG, NNF (PRRD), TBNG

- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

LMNG, NNF (PRRD)

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Under this alternative, adjustments in livestock grazing intensities, increased attention to riparian and wooded draw habitats, direction on protecting and restoring streams and springs, introduction of rest pastures and added emphasis on restoring native vegetation overall should improve habitat conditions for this species.

Outcome II is selected as the risk assessment for the tawny crescent butterflies. This species' habitat, while very local, is widely distributed. Land uses, particularly livestock grazing, spring development, and pesticide use, will be managed in such a way to avoid direct threats to this species. No need for supplemental stocking is anticipated.

GR/CRNG, TBNG, ONG

Determination is "no impact." The species presence on these areas has not been confirmed and documented. However, management direction is provided for this species and potential habitat on these areas. If the species presence had been confirmed, the determination would have been "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Arogos Skipper (*Atrytone arogos*)

Species Description

The arogos skipper has a wingspan of about 1.25 inches. Males are yellow-orange on the dorsum, with wide dark borders. Females are darker. The under surfaces of both sexes are bright golden (Royer and Marrone 1992, NatureServe 2000).

There are two subspecies; *A. a. iowa*, is the subspecies that occurs in the planning area, and is the focus of this account.

After hatching, arogos skipper larvae live in nests of rolled or tied leaves. Larvae likely overwinter as fourth instar, and resume feeding the following spring. In North Dakota, adults emerge from pupal stage in mid-June and persist into July (Royer and Marrone 1992).

Distribution and Status

The arogos skipper (both subspecies combined) is resident throughout much of the eastern and central United States, from New York south to Florida, and from North Dakota to the Texas Gulf Coast, and west to eastern Wyoming (NatureServe 2000). The species is mostly found in widely separated and isolated colonies. It is seldom common anywhere.

Table H-6 summarizes this species' occurrence in the planning area. *A. a. iowa* is thought to occur on the Sheyenne, Fort Pierre, Buffalo Gap, Thunder Basin, Oglala, and the Grand River and Cedar River National Grasslands (Royer 1996, NatureServe 2000).

Populations of *A. a. iowa* are more stable than those of the eastern subspecies, *A.a. argos.* (Royer and Marrone 1992, NatureServe 2000), but *A. a. iowa* is still assumed to have suffered a sharp decline from historical conditions. In 1869, Scudder identified this subspecies as the most

abundant of its genus in Iowa. Today, it is very local and uncommon. The reasons for decline are undoubtedly the widespread alternation, destruction, and fragmentation of prairie habitats (Panser 1988 cited in NatureServe 2000).

Organization Rankings

Arogos skipper is classified as a sensitive species in Region 1 of the Forest Service. The International Network of Natural Heritage Programs and Conservation Data Centeres, has assigned this skipper a rank of G3/G4, meaning "vulnerable" or "apparently secure." The national ranking for the United States (N3/N4), is similar.

Habitat

The arogos skipper uses relatively undisturbed tall, mixed, and shortgrass prairies. Adults visit species such as purple coneflower, long-headed coneflower, black-eyed susan, and various thistles. Larvae host plants include big bluestem, little bluestem, and possibly *Panicum* species.

Conservation Planning

Moffat and McPhillips (1983) provide a general set of habitat management guidelines for butterflies in the Northern Great Plains. Royer and Marrone (1992) prepared a conservation assessment on this species for North and South Dakota.

Direct and Indirect Effects on NFS Lands

Management practices that might impact arogos skipper include grazing and the use of pesticides (particularly for leafy spurge, Canada thistle, and grasshopper control).

The impact of controlled burning and mowing on this species is not well understood (NatureServe 2000).

Habitat that is invaded by exotics, such as brome grass, leafy spurge, and bluegrass, is soon degraded (Royer and Marrone 1992).

Cumulative Effects

Because of this species' low vagility, the cumulative effects area considered was relatively small, and coincided with the administrative boundaries of relevant planning units. Factors affecting arogos skipper populations within this area are the continuing conversion of native grasslands to cropland, groundwater withdrawal, and the use of grasslands for early summer hay production, as well as the types of management mentioned above (Ostlie et al. 1997, USDA Forest Service 2000, Arenz and Joern 1996).

Interrelated and Independent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

Moffat and McPhillips (1983) offered the following conservation measures:

- Protect the Sheyenne sandhills area from overgrazing.
- Exclude livestock from known Arogos skipper locations.
- Increase bluestem and enhance nectar sources.

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

GR/CRNG, SNG, TBNG, BGNG, FPNG, ONG

- Do not authorize vegetation management and construction projects that would further isolate butterfly populations (Standard).
- Design vegetation management and pesticide application projects to reduce butterfly mortality and to maintain nectar and larvae host plants (Guideline).
- Manage for native forb abundance and diversity to provide foraging habitat for big game, grassland birds, and other grassland wildlife (Guideline).
- Prohibit control of native insects until an evaluation of impacts to other resources is made (Guideline).
- Prohibit use of pesticides that would adversely affect species at risk (Guideline).

GR/CRNG, SNG

- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

GR/CRNG, SNG, TBNG, BGNG, FPNG, ONG

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).
- Emphasize late fall mowing instead of prescribed burning at historic or known sites with Argos Skipper (Guideline).
- Rest areas with historic or known populations of sensitive skippers (Guideline).
- Conduct butterfly and skipper surveys (Guideline).

Management Area Direction (Chapter 3)

SNG

- MA 3.66
- Initiate intensive restoration efforts to meet desired conditions that include active and passive methods. Native reseeding projects may be initiated with local seed sources (Guideline).

Monitoring Direction (Chapter 4)

GR/CRNG, SNG, TBNG, BGNG, FPNG, ONG

- Monitor populations and habitat
- Monitor the effectiveness of the stocking rates in Appendix I in meeting desire vegetation composition and grassland structure levels.

Appendices

GR/CRNG, SNG, TBNG, BGNG, FPNG, ONG

- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

GR/CRNG, SNG

Determination is "no impact." The species presence on these areas has not been confirmed and documented. However, management direction is provided for this species and potential habitat on these areas. If the species presence had been confirmed, the determination would have been "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Under this alternative, adjustments in livestock grazing intensities, introduction of rest pastures (particularly in butterfly areas), use of surveys, and added emphasis on restoring native vegetation, especially forbs, should improve habitat conditions for this species.

TBNG, BGNG, FPNG, ONG

No biological determination is made for this species on these areas because the species is not listed as sensitive in Region 2 of the Forest Service. Also, the species presence on these areas has not been confirmed and documented. However, management direction is provided for this species and potential habitat on these areas.

Flathead Chub (*Platygobio gracilis*)

Species Description

This member of the Cyprinidae family is a large (95-190 mm) silvery minnow, with small eyes and sickle-shaped pectoral fins. The flathead chub spawns during mid or late summer when water temperatures are relatively high. They feed primarily on terrestrial insects and small invertebrates (Lee et al. 1980), but also consume some aquatic vegetation. Flathead chubs provide a forage base for larger piscivorous fish and are commonly used as baitfish by anglers (Lee et al. 1980).

Distribution and Status

The flathead chub is found in large, turbid rivers from the Northwest Territories south through the Great Plains.

Table H-6 summarizes species occurrence and status in the planning area. Much of this information is presented in Tibbs (1998). The species is currently found in the Cheyenne River (Buffalo Gap National Grassland and Thunder Basin National Grassland) and in Little Missouri River (Little Missouri National Grassland) and some of their tributaries. It is also found in the Grand River (Grand River National Grassland). It also occurs in the Bad River (Buffalo Gap National Grassland), Dismal River (Nebraska National Forest), Niobrara River (Samuel R. McKelvie National Forest), Hat Creek (Oglala National Grassland) and Antelope Creek (Thunder Basin National Grassland).

Recent studies have indicated that the range and populations of this species may be declining (Tabor 1993). The flathead chub has declined in abundance in the lower Missouri River, largely as a result of water pollution and changes in water regime due to impoundments (U.S. Fish and Wildlife Service 1995).

Organization Rankings

The flathead chub has been assigned a global rank of G5. It is classified as a sensitive species in Region 2 of the Forest Service.

Habitat

This species inhabits a wide variety of aquatic habitats, but is most abundant in the main channels of turbid, moderate to strong current rivers, with mud, rock, or sand substrates. They can also be found in pools in small clear streams. The flathead chub appears to be tolerant of a wide variety of environmental conditions.

Conservation Planning

A statewide or regional conservation plan has not been prepared for this species. However, Region 3 (Midwest Region) of the U.S. Fish and Wildlife Service has prepared a range-wide status assessment for this species (Tibbs 1998).

Direct and Indirect Effects on NFS Lands

Toxic spills into rivers and streams could threaten local populations.

Small impoundments on federal rangelands may modify hydrological flow patterns, especially during droughts and runoff events, and alter or reduce downstream flow.

Cumulative Effects

Flathead chub are impacted by many other activities in the planning area, with the most serious being changes in natural hydrologic regimes due to impoundments and dewatering (Ostlie et al. 1997, Tibbs 1998, Johnson 1998, Natural Resource Conservation Service 1996). In fact, aquatic resources and habitats in the planning area are some of the most fragmented and altered within North America (Abell 2000). In addition, flathead chubs are often used as baitfish.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development and additional roads, traffic and pipelines.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

LMNG, GR/CRNG, TBNG, BGNG, ONG, NNF (BRD), SRMNF

- Manage land treatments to conserve site moisture and to protect long-term stream, wetland, and riparian area health (Standard).
- Allow only those actions next to perennial and intermittent streams, seeps, springs, lakes, and wetlands that maintain or improve long-term proper functioning of riparian ecosystem conditions (Standard).
- Design activities to protect and manage the riparian ecosystem (Standard).
- Locate activities and facilities away from riparian areas unless alternatives have been assessed and determined to be more environmentally damaging (Guideline).
- Design and construct all stream crossing and other in-stream structures to provide for sufficient passage of flow and sediment, withstand expected flood flows, and allow free movement of aquatic life (Standard).
- When possible, restore intermittent streams to continually flowing perennial streams (Guideline).
- Design and construct facilities to minimize the risk of accidental spills and discharge of petroleum and other materials into waters occupied by sensitive fish species (Standard).
- Do not authorize uses that would deplete instream flows below levels needed to protect sensitive fish habitat (Standard).
- Manage livestock grazing to maintain or improve riparian areas (Guideline).

Geographic Area Direction (Chapter 2)

- None

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

LMNG, GR/CRNG, TBNG, BGNG, ONG, NNF (BRD), SRMNF

- Monitor populations and habitat

Biological Determinations, Risk Assessments, and Rationale

TBNG, BGNG, ONG, NNF (BRD), SRMNF

The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." The management direction provides adequate protection for this species and its habitat from adverse negative effects resulting from Forest Service authorized activities and allocations. The flathead chub's adaptability to a wide range of environmental conditions also helps support this determination.

Outcome II is the selected risk assessment for this species in these areas. Because of the species current distribution, it's likely that the species would repopulate any unoccupied but suitable habitat in these areas.

LMNG, GR/CRNG

No biological determination is made for this species on these areas because the species is not listed as sensitive in Region 1 of the Forest Service. The conservation measures listed above are expected enhance its habitat and/or protect the species and its habitat from possible adverse effects of Forest Service authorized activities and allocations.

Longnose Sucker (*Catastomus catastomus*)

Species Description

This member of the Catostomidae family ranges from dwarf forms to over 600 mm in length. It is highly variable morphologically across its range (Lee et al. 1980). This species spawns during spring and early summer when water temperatures are relatively cold. Bottom invertebrates make up the bulk of the longnose sucker's diet.

Distribution and Status

The longnose sucker is the most widespread sucker in northern North America (NatureServe 2000). It is found throughout most of Alaska and Canada, south to New England, West Virginia, Maryland, northern Ohio, northern Indiana, Minnesota, Nebraska, eastern Colorado, Idaho, and Washington. It is also found in northeastern Asia (NatureServe 2000).

Table H-6 summarizes species occurrence and status in the planning area. The only NFS lands in the planning area associated with this species are the Little Missouri National Grassland, where the species occurs in the Little Missouri River.

Organization Rankings

The longnose sucker is listed as threatened by South Dakota. Its global conservation rank is G5, meaning "secure". It is not classified as a sensitive species in either Region 1 or 2 of the Forest Service.

Habitat

The longnose sucker is found in cool, spring-fed streams where it feeds on the bottom on algae, crustaceans, snails, and insect larvae. It spawns in lakes or in shallow-flowing streams over gravel.

Conservation Planning

A statewide or regional conservation plan has not been prepared for this species.

Direct and Indirect Effects on NFS Lands

Activities that have the greatest potential to impact this species' habitat are those that contribute to non-point water pollution, such as excessive livestock grazing in riparian areas.

Toxic spills into rivers and streams could also threaten local populations.

Small impoundments on federal rangelands may modify hydrological flow patterns, especially during droughts, and reduce downstream flow.

Cumulative Effects

Aquatic resources and habitats in the planning area are some of the most fragmented and altered within North America (Abell 2000). In addition to the potential impacts of grazing, toxic spills, and small impoundments on non-National Forest System Lands, longnose suckers are impacted by many other activities in the Little Missouri River drainage, with the most serious being changes in natural hydrologic regimes due to spring development, large impoundments and dewatering (Ostlie et al. 1997, Johnson 1998, Natural Resource Conservation Service 1996).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. This further results in the need to provide livestock water, often in the form of small impoundments in drainages.

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development and additional roads, traffic and pipelines.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

LMNG

- Manage land treatments to conserve site moisture and to protect long-term stream, wetland, and riparian area health (Standard).
- Allow only those actions next to perennial and intermittent streams, seeps, springs, lakes, and wetlands that maintain or improve long-term proper functioning of riparian ecosystem conditions (Standard).

LMNG, cont.

- Design activities to protect and manage the riparian ecosystem (Standard).
- Locate activities and facilities away from riparian areas unless alternatives have been assessed and determined to be more environmentally damaging (Guideline).
- Design and construct all stream crossing and other in-stream structures to provide for sufficient passage of flow and sediment, withstand expected flood flows, and allow free movement of aquatic life (Standard).
- When possible, restore intermittent streams to continually flowing perennial streams (Guideline).
- Manage livestock grazing to maintain or improve riparian areas (Guideline).

Geographic Area Direction (Chapter 2)

- None

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

- None

Biological Determinations, Risk Assessments, and Rationale

LMNG (Little Missouri River and tributaries)

Biological determinations are not made for this species since it is not listed as sensitive by Region 1 of the Forest Service. The conservation measures listed above are expected enhance its habitat and / or protect the species and its habitat from possible adverse effects of Forest Service authorized activities and allocations.

Plains Topminnow (*Fundulus sciadicus*)

Species Description

The plains topminnow is a small fish (38-64 mm) that is olive brown in color, with bronze reflections. It lacks the side bars present on the banded killifish. Breeding males have orange or red colored fins (Ashton and Dowd 1991). Spawning occurs in early summer. Eggs are deposited on submerged aquatic vegetation and algae. Likely food items consist of small aquatic insects and aquatic vegetation (Lee et al. 1980).

Distribution and Status

There are two disjunct population centers for this species. One is centered in Nebraska and the other is mostly limited to Missouri.

Table H-6 summarizes species occurrence and status in the planning area. It is known to occur in the Dismal River (Nebraska National Forest), Niobrara River (Samuel R. McKelvie National Forest), and Cheyenne River (Buffalo Gap and Thunder Basin National Grasslands), and Antelope Creek (Thunder Basin National Grassland).

Specific rangewide population trend data is not available, but it appears that some population loss or range retraction has occurred, especially on the periphery of the northern portion of its range (NatureServe 2000).

Organization Rankings

The plains topminnow is classified as a sensitive by Region 2 of the Forest Service. The global rank of the plains topminnow is G4.

Habitat

The plains topminnow prefers shallow streams with clear water and sand or gravel substrates. This species will also utilize sloughs and backwater habitats. Special habitat requirements include abundant aquatic vegetation.

Conservation Planning

A statewide or regional conservation plan has not been prepared for this species.

Direct and Indirect Effects on NFS Lands

Plains topminnow and its habitat can be negatively affected by excessive grazing in riparian areas.

Other potential threats are toxic spills into rivers, and small impoundments on federal rangelands that modify hydrological flow patterns, especially during droughts, and reduce downstream flow.

Cumulative Effects

Aquatic resources and habitats in the planning area are some of the most fragmented and altered within North America (Abell 2000). In addition to the potential impacts of grazing, toxic spills, and impoundments on non-National Forest System Lands within the relevant watersheds, plains topminnow are impacted by many other activities in Nebraska and eastern Wyoming (i.e. the cumulative effects area for this species). The most serious of these are probably the changes in natural hydrologic regimes due to impoundments and dewatering (Ostlie et al. 1997, Johnson 1998, Natural Resource Conservation Service 1996).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development and additional roads, traffic and pipelines.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

TBNG, BGNG, NNF (BRD), SRMNF

- Manage land treatments to conserve site moisture and to protect long-term stream, wetland, and riparian area health (Standard).
- Allow only those actions next to perennial and intermittent streams, seeps, springs, lakes, and wetlands that maintain or improve long-term proper functioning of riparian ecosystem conditions (Standard).
- Design activities to protect and manage the riparian ecosystem (Standard).
- Locate activities and facilities away from riparian areas unless alternatives have been assessed and determined to be more environmentally damaging (Guideline).
- Design and construct all stream crossing and other in-stream structures to provide for sufficient passage of flow and sediment, withstand expected flood flows, and allow free movement of aquatic life (Standard).
- When possible, restore intermittent streams to continually flowing perennial streams (Guideline).
- Design and construct facilities to minimize the risk of accidental spills and discharge of petroleum and other materials into waters occupied by sensitive fish species (Standard).
- Do not authorize uses that would deplete instream flows below levels needed to protect sensitive fish habitat (Standard).
- Manage livestock grazing to maintain or improve riparian areas (Guideline).

Geographic Area Direction (Chapter 2)

- None

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

TBNG, BGNG, NNF (BRD), SRMNF

- Monitor populations and habitat.

Biological Determinations, Risk Assessments, and Rationale

TBNG, BGNG (Cheyenne River and tributaries)

The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." The management direction provides adequate protection for this species and its habitat from adverse negative effects resulting from Forest Service authorized activities and allocations.

The risk assessment for this species in the Cheyenne River was difficult. The Cheyenne River, including its upper reaches, is more characteristic of a turbid Great Plains river and was probably never quality clear water habitat for the species. In fact, it's believed that the presence of the species in the upper reaches of the river is the result of introductions (Baxter and Simon 1970). As the result of more controlled grazing, small impoundment construction in uplands,

and Angostura Reservoir in South Dakota, current water clarity probably exceeds historic levels. However, much of the river still provides marginal habitat for the species. Outcomes III or V is selected as the risk assessments for this species in those reaches of the river within or immediately downstream from these national grasslands. These higher risk levels are the result of natural habitat conditions and not management of the national grasslands.

NNF (BRD), SRMNF (Dismal and Niobrara Rivers)

The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." The management direction provides adequate protection for this species and its habitat from adverse negative effects resulting from Forest Service authorized activities and allocations. In fact, because of the lack of significant runoff in the Nebraska sandhills, it is highly unlikely that any authorized activities or allocations could significantly alter water quality or quantity on site or downstream in these sandhill rivers.

Outcome I or II is selected as the risk assessments for this species in these rivers. Water quantity and quality in the sandhill rivers in these areas have largely been unaltered from human activities. It's also likely that the species could repopulate any unoccupied but suitable habitat in these rivers.

Northern Leopard Frog (*Rana pipiens*)

Species Description

Northern leopard frogs are typically 2-3 ½ inches long, and are either brownish or greenish, with two or three irregular rows of dark round spots with light borders. They breed from March to June. Egg-laying usually occurs over a span of about 10 days at a particular site. Typically, hundreds or even thousands of eggs are deposited into an egg mass. Aquatic larvae metamorphose in summer but may overwinter in that condition in some areas (NatureServe 2000). Metamorphosis occurs between late July and mid-September.

Metamorphosed frogs feed primarily on invertebrates such as insects, though some amphibians and small fish are also taken. Larvae eat algae, plant tissue, organic debris, and small invertebrates (NatureServe 2000).

Distribution and Status

Northern leopard frogs are widespread throughout Canada and the United States, being found from Great Slave Lake and Hudson Bay south to Kentucky and New Mexico (NatureServe 2000).

Table H-6 summarizes species occurrence and status in the planning area. It is known to occur on all units.

Although the northern leopard frog is still widespread and common in many areas, some populations appear to have declined, especially those in the Rocky Mountains of Colorado, Wyoming, and Montana (NatureServe 2000). Reasons for this decline include habitat loss, commercial overexploitation, and competition by bullfrogs.

Organization Rankings

The northern leopard frog is classified as sensitive in Regions 1 and 2 of the Forest Service. It has been assigned a rank of G5 by the International Network of Natural Heritage programs and Conservation Data Centeres. A G5 rank is for taxa that are "secure."

Habitat

Northern leopard frogs are wetland obligates, using a wide variety of aquatic habitats, such as springs, slow streams, marshes, reservoirs, and lakes. It is most often found at sites with permanent water and rooted aquatic vegetation. Aquatic vegetation such as rushes or sedges are important in breeding ponds for egg mass attachment. In summer, adults are often found wandering in wet meadows, where they generally avoid vegetation over 12 inches while foraging. It overwinters underwater.

The number and total acreage of constructed and natural wetlands (seasonal and permanent) on each planning unit are as follows:

Planning Unit	Number of Wetlands	Total Acreage of Wetlands
LMNG	3,899	2,446
SNG	4,858	7,865
GR/CRNG	609	695
FPNG	928	2,995
BGNG	2,991	3,874
ONG	334	564
NNF(PPRD)	13	4
NNF (BRD)	108	181
SRMNF	76	387
TBNG	Not Available	Not Available

The data in the above table for the Samuel R. McKelvie National Forest does not include the large wetlands complexes associated with those portions of Merritt Reservoir located on the national forest. Also, wetlands under forest canopies may have been partially or totally missed during the inventory, so the above data likely underestimate the amount of wetlands, especially on the Nebraska National Forest (Pine Ridge Ranger District). The actual amount of wetlands that is suitable for this species is unknown.

Conservation Planning

Statewide or regional habitat conservation strategies have not been prepared for this species.

Direct and Indirect Effects on NFS Lands

Proposed management is unlikely to have much affect on northern leopard frog populations or their habitats. Potential impacts include creation of new wetlands such as stock ponds. The most likely impact however, is potential changes in wetland emergent vegetation due to livestock grazing, although livestock rarely forage on flooded emergents. Any management that resulted in lowered water tables and the loss or degradation of wetland habitat would also impact this species.

Cumulative Effects

Northern leopard frogs are affected by additional management activities within the administrative boundaries of the planning units (i.e. the cumulative effects area). These include use of the frog for commercial purposes, wetland drainage and filling, and water pollution (Ostlie et al. 1997, Johnson 1998, Corn and Peterson 1996, Pederson et al. 1989, Davis 2000, Natural Resource Conservation Service 1996).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

All Planning Units

- Manage land treatments to conserve site moisture and to protect long-term stream, wetland, and riparian health from damage by increased runoff (Standard).
- Allow only those actions next to perennial and intermittent streams, seeps, springs, lakes, and wetlands that maintain or improve long-term proper functioning of riparian ecosystem conditions (Standard).
- Design activities to protect and manage the riparian ecosystem. Maintain the integrity of the ecosystem, including quantity and quality of surface and ground water (Standard).
- Maintain and protect the hydrologic regime that supplies ground water to the wetlands so as to support species and habitats dependent on the existing water table and its natural variations (Standard).
- To provide protection for riparian areas, locate activities and facilities away from the water's edge or outside the riparian areas, woody draws, wetlands, and floodplains unless alternatives have been assessed and determined to be more environmentally damaging (Guideline).
- Do not deposit waste material below high water lines, in riparian areas, in areas immediately adjacent to riparian areas, or in natural drainage-ways (Guideline).
- Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function and meet regulations found in Section 404(b)(1) of the Clean Water Act (Standard).
- Design and implement livestock grazing strategies to provide well-developed emergent vegetation through the growing season on 30-50% of the wetlands distributed across watersheds and landscapes (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

SNG

- Prohibit additional draining of the Sheyenne National Grassland (Standard).

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

All Planning Units

- Monitor populations and habitat.
- Monitor restoration of waterbodies that have been degraded by Forest Service permitted or management actions.

LMNG, GR/CRNG, SNG

- Monitor the extent that surface water, sub-surface flows, and aquifers have been protected from contamination by management actions.

Biological Determinations, Risk Assessments, and Rationale

All Planning Units

Management activities will have minimal potential to affect northern leopard frogs because of the riparian and wetland management direction and the fact that no wetland drainage or filling is expected. Based on these considerations, the biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Outcome I is selected as the risk assessment for this species. Adverse impacts from activities authorized by the Forest Service are not expected. In fact, the construction of large numbers of small impoundments on the national grasslands has created a considerable amount of new habitat for this species.

Blanding's Turtle (*Emydoidea blandingii*)

Species Description

The Blanding's turtle is a medium (5-10") sized turtle with a yellow chin and throat, and long neck. Its smooth carapace is brown or gray with profuse light spots, while its plastron is yellowish with black blotches. A well-developed hinge lies between the pectoral and abdominal scutes.

This turtle is mostly aquatic, but can be found wandering on land searching for mates, nesting sites, or new habitat (Rowe and Moll 1991). In addition, turtles have been observed to "estivate" on land for several hours to several days to avoid cool water temperatures (Ross and Anderson 1990, Rowe and Moll 1991)

Eggs are laid in sandy soil in upland areas, usually in warm sunny sites. Like other freshwater and terrestrial turtles, Blanding's turtle often chooses disturbed sites. The breeding cycle for this species begins with courtship and copulation in March-May. Nesting occurs mid-June to mid-July in Nebraska. In Nebraska, clutch size averages about 15 eggs. Incubation length varies with the ambient temperature.

Blanding's turtles are omnivorous (Graham and Doyle 1977), feeding on crayfish, insects, and vegetable matter, as well as fish, eggs, and frogs (Lagler 1943, Bleakney 1963). Unlike most aquatic turtles, Blanding's turtles will eat food both in the water and out of the water.

Distribution and Status

The Blanding's turtle's range is centered in the Great Lakes region, forming a broad band from Nebraska northeast through the Midwest to Nova Scotia. In this relatively wide area, the species distribution is spotty, with some widely disjunct populations. Within the planning area, Blanding's turtle is known to occur along the Snake River in the vicinity of the Samuel R. McKelvie National Forest.

The Blanding's turtle is believed to be declining in many areas, but its current status is poorly documented. Habitat loss and high levels of predation on eggs are the most likely causes of its decline.

Organization Rankings

The Blanding's turtle is endangered in South Dakota and has a global conservation rank of G4. It is not classified as a sensitive species in Regions 1 and 2 of the Forest Service.

Habitat

Blanding's turtle inhabits aquatic habitats with soft bottoms and aquatic vegetation, including riverine (low gradient pools), lacustrine (shallow water), and palustrine (forested wetlands, herbaceous wetland, riparian, and scrub-shrub wetland) systems.

Specific habitats include marshes, ponds, swamps, lake shallows, backwater sloughs, shallow slow-moving rivers, protected coves, and inlets of large lakes, oxbows, and pools adjacent to rivers (Kofron and Schreiber 1985, Nyboer 1992, Ernst et al. 1994). Prairie marsh or wet prairie, especially associated with sandy soils, is the preferred habitat in the western part of the range (Kofron and Schreiber 1985, Nyboer 1992).

Hibernation most often occurs within organic substrate of ponds and creeks, although turtles have been reported overwintering beneath leaves several feet from the water (Conant 1951).

Conservation Planning

Canada has developed a recovery plan for Blanding's turtle.

Direct and Indirect Effects on NFS Lands

Livestock grazing, prescribed burning, and mowing may have minor impacts on Blanding's turtle by influencing water quality and aquatic vegetation.

Mortality can result from traffic on roadways.

Cumulative Effects

Most Blanding's turtle habitat occurs on private land within the planning area, but little is known of the species' status. Impacts to Blanding's turtle habitat on areas other than the planning units in Nebraska include: cultivation to the edge of sloughs and ponds, inundation or drainage of wetland habitat for agriculture, river channelization, and water impoundments (Ostlie et al. 1997, Johnson 1998, Pederson et al. 1989, Davis 2000, Natural Resource Conservation Service 1996). Lowering water levels to remove undesired fish such as carp has also been harmful to Blanding's turtle, as has development of upland nesting sites and habitat fragmentation. The decline of habitat on private lands can be expected to continue as agricultural uses intensify.

Road mortality has also been suggested as a threat. The turtles' habit of wandering long distances to nest may be a limiting factor in their adaptation to humans. Like other chelonians, Blanding's turtles are easily trapped and susceptible to collection for the pet trade. Collectors may earn $45 for a 6-8 inch (15-20 cm) turtle.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a grazing agreement.

Conservation Measures and Mitigation

Within the planning area, we know almost nothing about the Blanding's turtle. If the species is at risk and actually declining in the waters on and near the Nebraska and Samuel R. McKelvie National Forest, the first step should be a detailed inventory of aquatic areas in these areas followed by a monitoring program.

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

NNF (BRD), SRMNF

- Manage land treatments to conserve site moisture and to protect long-term stream, wetland, and riparian area health (Standard).
- Allow only those actions next to perennial and intermittent streams, seeps, springs, lakes, and wetlands that maintain or improve long-term proper functioning of riparian ecosystem conditions (Standard).
- Design activities to protect and manage the riparian ecosystem (Standard).
- Locate activities and facilities away from riparian areas unless alternatives have been assessed and determined to be more environmentally damaging (Guideline).
- Design and construct all stream crossing and other in-stream structures to provide for sufficient passage of flow and sediment, withstand expected flood flows, and allow free movement of aquatic life (Standard).

- When possible, restore intermittent streams to continually flowing perennial streams (Guideline).
- Manage livestock grazing to maintain or improve riparian areas (Guideline).

Geographic Area Direction (Chapter 2)

- None

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

NNF (BRD), SRMNF

- Monitor restoration of waterbodies that have been degraded by Forest Service permitted or management actions?

Biological Determinations, Risk Assessments, and Rationale

SRMNF (Snake River)

Biological determinations are not made for this species on this area since it is not listed as sensitive by Region 2 of the Forest Service. The conservation measures listed above are expected enhance its habitat and/or protect the species and its habitat from possible adverse effects of Forest Service authorized activities and allocations.

NNF (BRD) (Middle Loup and Dismal Rivers)

No biological determination is made for this species on this area because the species is not listed as sensitive in Region 2 of the Forest Service. Also, the species presence on this area has not been confirmed and documented. However, management direction is provided for this species and potential habitat on this area.

American Bittern (*Botaurus lentiginosus*)

Species Description

The American bittern is a stocky wading bird with a straight pointed bill, relatively short neck and legs, and somewhat pointed wings. It is brownish overall, with a dull yellow bill and greenish yellow legs and feet.

The American bittern is a non-colonial nester. The nest is placed on a mound of reeds, sedges or cattails, rising 3-8 inches above the water. Most often the nest site is in shallow (2-8 inches) water, but it is occasionally placed on dry ground in dense, tall (>12") grasslands (Gibbs et al. 1992). Nests are usually accessed by two, well-beaten pathways (Gabrielson 1914).

Egg-laying begins in late April or early May, and continues until mid-June. In the north-central U.S., nests may contain eggs from about early May to early July (Brewer et al. 1991). Clutch size usually ranges from three to five (Duebbert and Lokemoen 1977). Incubation lasts about 24-28 days (Burns 1915, Vesall 1940), and chicks remain at or near the nest for two weeks (Gabrielson 1914, Vesall 1940, Terres 1980).

The American bittern eats mainly fishes, crayfishes, amphibians, mice and shrews, insects, and other animals. It feeds its young by regurgitation. It is a solitary feeder that relies more on stealth than pursuit to capture prey. Its coloration, particularly its ventral stripes, provides camouflage in dense, vertical marsh vegetation, and complements its inactive feeding repertoire (Kushlan 1978). Crypsis is thought to function mostly to reduce visibility to prey and competitors rather than to predators (Kushlan 1978).

Distribution and Status

American bitterns nest throughout most of southern Canada and the northern United States. They winter along much of the United States' southern coastline and into Mexico

In the planning area, American bittern are known or may possibly occur on all planning units, with the exception of the Pine Ridge area of the Nebraska National Forest and the Thunder Basin National Grassland. Due to a scarcity of habitat, nesting is likely very limited, with the species only being common on the Sheyenne National Grassland (D. Svingen prof. opin.).

This species is typically present on the breeding grounds from mid-April to late August, with exceptionally late birds being present into early December (Bent 1963, Johnsgard 1980, Gibbs et al. 1992).

Across its broad range, bittern populations are declining due to habitat destruction. Breeding Bird Survey (BBS) data (1966-1987) indicate a decline in the north-central United States (Brewer et al. 1991) and possibly in New England (USFWS 1987). BBS data suggest a 2.4% annual decline in U.S. populations between 1966 and 1989.

Organization Rankings

Region 2 of the Forest Service classifies the American bittern as a sensitive species. The International Network of Natural Heritage programs and Conservation Data Centeres has assigned the American bittern a rank of G4, meaning "apparently secure." The national ranking for the United States (N4), is similar. The American bittern was listed as a "nongame species of management concern" by the USDI Fish and Wildlife Service in 1987 (cited in Gibbs et al. 1992).

Habitat

General

American bitterns are closely associated with wetlands and adjacent grasslands. In summer, bitterns use temporary, seasonal, semi-permanent, and permanent wetlands, as well as fens. In South Dakota, American bitterns most often were located in semi-permanent wetlands with open water in the center, a band of emergent vegetation around the periphery, and idle grassland in the adjacent uplands (Weber et al. 1982). Another study in South Dakota found that the occurrence of American bitterns within semi-permanent wetlands was related positively to the percentage of the wetland area that was vegetated (Naugle 1997 in DeChant et al. 1999). In North Dakota, American bittern density was highest in fen wetlands, followed by temporary and semi-permanent wetlands, seasonal wetlands, and permanent wetlands (Kantrud and Stewart 1984). In the Prairie Pothole region of North Dakota and South Dakota, American bitterns preferred seasonal and semi-permanent wetlands and avoided alkali wetlands, as well as other wetlands dominated by open water (Johnson et al. cited in Dechant et al. 1999). Bitterns tended to be more common in wetlands that were not isolated from other wetlands (ibid).

Nesting

American bitterns nest in uplands adjacent to wetlands or in the wetlands themselves. Most upland nests are in ungrazed grasslands, such as idle pasture, retired cropland, or uncut hayland (Dechant et al. 1999, NatureServe 2000). In Manitoba, Montana, North Dakota, and South Dakota, American bitterns nested in mid to tall (12-39 inch; 30-99 cm), dense, idle grasslands where the average maximum height of the leaf canopy (effective vegetation height) was >24 inches (60 cm), 100% vertical visual obstruction was usually >20 inches (50 cm), and litter cover was >50% (Kantrud and Higgins 1992). They avoided nesting in areas where vegetation height or 100% vertical visual obstruction values were less than about 12 inches (30 cm) or where the total cover contained >10% dead vegetation. Dominant plant species around nests were smooth brome, wheatgrass, alfalfa, and big bluestem (Duebbert and Lokemoen 1977, Kantrud and Higgins 1992). Nests were partially or completely concealed by vegetation on the side, but partially or completely exposed on top. No nests were found in cover <12 inches (30 cm) tall (Duebbert and Lokemoen 1977). Average vertical visual obstruction values of vegetation ranged from 17 to 39 inches (44 to 99 cm) around nests in North Dakota and Minnesota (Svedarsky 1992). Nests were located in tall (>24 inch (60 cm)) vegetation (Svedarsky 1992).

A study comparing idle grasslands to areas under various grazing systems found that American bitterns nested only in idle mixed-grass and were absent from the following (Messmer 1985):

- Short-duration (a system of pastures rotated through a grazing schedule of about 1 week grazed and 1 month ungrazed, repeated throughout the season)
- Twice-over (grazing a number of pastures twice per season, with about a 2-month rest in between grazing)
- Season-long (leaving cattle on the same pasture all season) grazing systems

One nest was found in a pasture under the short-duration system, but it had been initiated before cattle began grazing the area

Within wetlands and wet meadows, American bitterns nest in rush, sedge, bulrush, prairie cordgrass, sprangletop, tall mannagrass, common reed, reed canary grass, bur-reed, or cattail (Dechant et al. 1999, NatureServe 2000).

Area

American bitterns prefer relatively large ($\geq$7 acres; 3 ha) wetlands (Brown and Dinsmore 1986). Weber (1978) found that the occurrence of American bitterns in South Dakota wetlands was related to the area of adjacent idle grassland. The number of natural and constructed wetlands (riverine, lacustrine, and palustrine) and their total acreage on each of the planning units as determined by the National Wetlands Inventory are as follows:

Table H-7. Natural and Constructed Wetlands on the Planning Units.

Planning Unit	Number of Wetlands	Total Acreage of Wetlands	Greater than 7 Acres	
			Number	Acres
LMNG	3,899	2,446	20	262
SNG	4,858	7,865	144	2,490
GR/CRNG	609	695	10	207
FPNG	928	2,995	87	1,779
BGNG	2,991	3,874	73	1137
ONG	334	564	13	238
NNF(PPRD)	13	4	0	0
NNF (BRD)	108	181	8	73
SRMNF	76	387	5	335
TBNG	Not Available	Not Available	Not Available	

The data in the above table for the Samuel R. McKelvie National Forest does not include the large wetlands complexes associated with those portions of Merritt Reservoir located on the national forest. Also, wetlands under forest canopies may have been partially or totally missed during the inventory, so the above data likely underestimate the amount of wetlands, especially on the Nebraska National Forest (Pine Ridge Ranger District). The amount of wetlands habitat greater than 7 acres in size and adjoining grasslands that are currently suitable for bittern nesting is unknown.

Conservation Planning

There is no conservation plan for the American bittern. However, many federal and state waterfowl management efforts recognize the need to provide appropriate upland and wetland habitat for various associated species. Such efforts undoubtedly benefit American bitterns.

Direct and Indirect Effects on NFS Lands

Livestock grazing, burning, and mowing that reduces or eliminates grassland cover and emergent vegetation can reduce habitat suitability for American bitterns (Duebbert and Lokemoen 1977, Messmer 1985).

The design and construction of new water impoundments that provide extensive and well-developed emergent zones can create new habitat for bitterns, especially if suitable grassland cover adjoins the new wetlands.

Cumulative Effects

American bittern are most threatened by wetland loss and degradation due to drainage, filling, conversion, siltation and pollution. Wetland and upland conversion to agriculture has been substantial in the planning area (Ostlie et al. 1997, Johnson 1998, USDA Forest Service 2000, Chuluun et al. 1997, Abell et al. 2000, Pederson et al. 1989, Davis 2000, Natural Resource Conservation Service 1996). In addition, wetland and adjacent upland areas on private and public lands are frequently heavily grazed reducing appropriate vegetative cover for the American bittern. Conversely, private lands enrolled under the Conservation Reserve Program (CRP) may provide alternative nesting locations.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. These agreements are long term and collectively cover virtually all land suitable for grazing, including those areas near wetlands used by American bitterns. Consequently, there are few ungrazed wetlands and nearby uplands left idle. The extensive number of grazing permits affects management ability to idle selected wetlands and other areas.

Conservation Measures and Mitigation

Keys to management include protecting wetlands and adjacent uplands and maintaining idle upland habitat. The U.S. Geological Survey has developed several management recommendations (Dechant et al. 1999) for the American bittern. Those most relevant to the type of management proposed in this document are:

- Protect wetlands from siltation, eutrophication, chemical contamination, and other forms of pollution (Gibbs et al. 1992).
- Maintain water levels at < 24 inches, April-August (Hands et al. 1989 in DeChant et al 1999). Avoid complete draw-downs before mid-August. Use slow draw-downs to mimic natural wetland succession.
- If stock ponds are a part of a management plan, manage for growth of emergent vegetation (Weber 1978).
- Maintain a wide vegetative margin around wetlands to protect breeding habitat and to deter nest predators (Daub 1993 in DeChant et al. 1999).
- To maintain tall, dense, upland vegetation, disturbance (e.g., mowing, burning, and grazing) should not occur more often than every 2-5 year (Duebbert and Lokemoen 1977).

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

LMNG, GR/CRNG, SNG, BGNG, FPNG, ONG, NNF (BRD), SRMNF

- Manage land treatments to conserve site moisture and to protect long-term stream, wetland, and riparian area health from damage by increased runoff (Standard).
- Allow only those actions next to perennial and intermittent streams, seeps, springs, lakes, and wetlands that maintain or improve long-term proper functioning of riparian ecosystem conditions (Standard).
- Design activities to protect and manage the riparian ecosystem (Standard).
- Maintain and protect the hydrologic regime that supplies ground water to wetlands (Standard).
- Do not deposit waste material below high water lines or in riparian areas (Guideline).
- Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands (Standard).

LMNG, GR/CRNG, SNG, BGNG, FPNG, ONG, NNF (BRD), SRMNF, cont.

- Manage for high structure habitat in upland areas in proximity to wetlands with well-developed emergent vegetation (Guideline).
- Design and implement livestock grazing strategies to provide well-developed emergent vegetation through the growing season on 30 to 50% of wetlands (Guideline).

BGNG, FPNG, ONG, NNF (BRD), SRMNF

- Design new water impoundments to provide wetlands habitat (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

LMNG, GR/CRNG, SNG, BGNG, FPNG, ONG, NNF (BRD), SRMNF

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).

Management Area Direction (Chapter 3)

BGNG

- Kadoka Lake and Weta Pond were allocated (1,160 acres) to MA 3.64, and this allocation will help ensure that management activities in and around these larger wetlands will provide suitable nesting and brooding conditions for waterfowl, bitterns and other wildlife.
- Limestone Butte Reservoir was allocated (206 acres) to MA 3.64, and this allocation will help ensure that management activities in and around this large wetland will provide suitable nesting and brooding conditions for waterfowl, bitterns and other wildlife.

SRMNF

- Allocation of the Lord Lakes complex (611 acres) to MA 3.64 will help ensure that management activities in and around this large wetland and grassland complex will provide suitable nesting and brooding conditions for waterfowl, bitterns and other wildlife.

Monitoring Direction (Chapter 4)

- Monitor populations and habitat
- Monitor the effectiveness of the suggested stocking rates in Appendix I in meeting desired vegetation composition and grassland structure levels.

Appendices

LMNG, GR/CRNG, SNG, BGNG, FPNG, ONG, NNF (BRD), SRMNF

- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

LMNG, GR/CRNG, SNG

Biological determinations are not made for this species on these areas since it is not listed as sensitive by Region 1 of the Forest Service. The conservation measures listed above are expected enhance its habitat and/or protect the species and its habitat from possible adverse effects of Forest Service authorized activities and allocations.

NNF (BRD)

Determination is “no impact.” The species presence on these areas has not been confirmed and documented. However, management direction is provided for this species and potential habitat on these areas. If the species presence had been confirmed, the determination would have been "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

BGNG, FPNG, ONG, SRMNF

The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Several of the larger wetlands on these areas are allocated to MA 3.64 that prioritizes management of these areas for wetlands values. Objectives are also established to establish more structurally diverse grasslands, including increasing levels of high structure grasslands. Management direction also addresses the need to maintain emergent vegetation and grassland nesting cover near major wetlands. The risk assessment for this species was difficult because the number of bittern expected to be using habitats on or near these planning units is expected to be naturally very low. Outcome I or II is selected as the risk assessments for this species on these areas. It needs to be acknowledged that these planning units only provide minimal amounts of potential habitat for this species and this, plus the fact that American bitterns are dispersed solitary nesters, suggests that habitat enhancement activities on these lands will likely have minimal impact on American bittern populations in the planning area.

Greater Prairie Chicken (*Tympanuchus cupido pinnatus*)

Several key references were consulted and reviewed during this evaluation. Those references included Prose (1985), Bjugstad (1987), Schroeder and Robb (1993), Kobriger (1964), Bergerud and Gratson (1988), Svedarsky and Van Amburg (1996) and Svedarsky et al. (1999).

Species Description

The greater prairie chicken is brownish in overall color, with an intricate patterning of light and dark barring and spotting. It is approximately 17 inches in size.

Three greater prairie chicken subspecies are recognized. The heath hen (*T. c. cupido*) is now extinct. The Attwater’s prairie chicken (*T .c. attwateri*) is almost extinct (National Geographic 1987). This account pertains to the subspecies found in the planning area, *T.c. pinnatus.* Another close relative, the lesser prairie chicken (*T. pallidicinctus*) is currently a candidate species for protection under ESA.

Like sharp-tailed and sage grouse, greater prairie chickens establish spring display grounds for courtship and breeding. The location of some display grounds become traditional and is used annually. Shifts in annual locations of individual display grounds also occur in response to changing cover conditions and other factors. The number of display grounds varies with annual fluctuations in prairie chicken populations.

The greater prairie chicken nests on the ground in tall and dense grass. A typical clutch size ranges from 12 to 14 eggs. After an incubation period of 23-28 days, the eggs hatch and the young leave the nest with the hen, becoming independent at about 6-8 weeks of age (Baicich and Harrison 1997).

The primary diet of greater prairie chicken is forb and grass seeds supplemented occasionally with woody fruits and buds and insects. During winter, they increasingly rely on agricultural grains. However, on the Nebraska National Forest in the Nebraska sandhills, they seem to rely almost exclusively on native foods throughout the year. Young broods rely strongly on a diet of insects and succulent greens.

Distribution and Status

Distribution

Greater prairie chickens range from eastern North Dakota, northwestern and central Minnesota, northern Wisconsin, and northern Michigan, south to northeastern Colorado, Kansas, southern and northeastern Oklahoma, central Missouri, and southern Illinois. The Attwater's subspecies is found in southeastern Texas (DeGraaf et al. 1991).

The greater prairie chicken originally was found in 16 states, but has now been extirpated in seven of these. In the remaining states, the population trend in the last 25 years has been downward (Schroeder and Robb 1993). Conversely, the greater prairie chicken expanded into Alberta, Colorado, Manitoba, North Dakota, Ontario, and Saskatchewan. Most of this expansion was in the late 19th and early 20th centuries, following the demise of the great bison herds and the initial plowing of the drier prairies. This range expansion likely occurred as a result of the increase in mid and tall grass species due to the reduced bison grazing intensity and the availability of high-energy winter foods in the form of cultivated crops (Schroeder and Robb 1993). Greater prairie chickens are no longer present in Alberta, Manitoba, Ontario, and Saskatchewan.

Status

There is over 100,000 acres of habitat for greater prairie chicken on the private and federal lands within the Sheyenne National Grassland of which approximately 50,000 is on federal land. Recent surveys have indicated approximately 20 active prairie chicken and mixed display grounds in this area, most of which are on federal land. Annual counts of the number of males on display grounds have been conducted most years since 1961 (Kobriger et al. 1987). The number of males counted has fluctuated from a high of 410 (1980) to a low of 69 (1997). Some of this variation is undoubtedly the result of varying survey methods and intensities. Recent male counts are below the last 10 and 20-year averages of 173 and 215, respectively (B. Stotts, official file correspondence). Based on the 1997 and 1998 display ground counts, prairie chickens currently make up approximately 34% of the prairie grouse population on the Sheyenne National Grassland.

Approximately 114,000 acres of the Fort Pierre National Grassland is considered greater prairie chicken habitat. Recent surveys indicate there's approximately 90 active prairie chicken and mixed prairie chicken / sharp-tailed grouse display grounds on or near the National Grassland. The number of males counted on display grounds in a 10% block sample of this unit over the last ten years has varied from 12 (1989) to the most recent inventory of 303 (2000). Extrapolating the average number of males per display ground (7.6 per prairie chicken display ground and 3.8 per mixed display ground) to the estimated number of active display grounds on the National Grassland results in a current estimate of approximately 600 males for the entire unit. Assuming a 50:50 sex ratio, the estimated pre-breeding prairie chicken population for the Fort Pierre National Grassland and some of the adjoining private lands is approximately 1200 birds. This is undoubtedly an underestimate for the National Grassland and all the intermingled private lands since some prairie chicken display grounds on private lands were probably missed during surveys. Like elsewhere, annual fluctuations in prairie chicken populations are to be expected and can be considerable, especially during drought. Long-term population trend and the magnitude of annual fluctuation are more meaningful analyses. Enhanced nesting, brooding, and roosting cover can reduce the magnitude of annual population fluctuations during droughts. Based on the 1999 and 2000 display ground counts, prairie chicken currently make up approximately 77% of the prairie grouse population on the National Grassland and have substantially increased over the last decade. This percentage has varied from 28 to 82% since monitoring began in the late 1980s.

There are approximately 4,000 acres of primary habitat for prairie chicken in the larger valleys of the Nebraska National Forest (Bessey Ranger District). The adjoining hills provide additional habitat. All potential habitat is not currently occupied by prairie chickens. Recent surveys identified 9 active display grounds but additional grounds were likely missed. Reliable and repeated counts of males on display grounds have not been made. No estimates of total population of prairie chickens can be made since display ground surveys have been incomplete. Based on the 1998 and 1999 harvests, prairie chickens currently make up approximately 18 to 23%of the prairie grouse population on the National Forest (Len McDaniel, official file correspondence). This percentage has varied from 0 to 36% since monitoring began in 1980.

There are approximately 31,000 acres of primary habitat in the larger valleys for prairie chicken on the Samuel R. McKelvie National Forest, and the adjoining hills provide additional habitat. This habitat is essentially unoccupied by prairie chicken. Recent surveys identified 2 active display grounds but they were present for only 1 year and were not observed subsequently. It's possible that one or more display grounds on the National Forest were probably missed. Since harvests were first monitored beginning in 1979, prairie chickens have made up 3% or less of the annual prairie grouse population on the National Forest (Len McDaniel, official file correspondence).

Although prairie chickens can make considerable seasonal movements, they are considered non-migratory in the planning area.

Table H-6 summarizes species occurrence and status in the planning area. Greater prairie chicken populations are found on the Sheyenne and Fort Pierre National Grasslands and the Nebraska and Samuel R. McKelvie National Forests.

Organization Rankings

The greater prairie chicken is classified as a sensitive species in Regions 1 and 2 of the Forest Service. The Partners in Flight program identifies the greater prairie chicken as a "high priority" in North Dakota, South Dakota, and Nebraska. It is ranked as a G4 species.

Habitat

General

Greater prairie chickens are grassland specialists, and are largely restricted to tallgrass, sandhills, and mixed grass prairies. Optimal habitat in its northern range is interspersed with moderate amounts of small-grain cropland.

Breeding

Display grounds are typically slightly elevated open areas of short grass.

Nesting

Greater prairie chickens in the planning area usually select the tallest and densest mid and tall grass cover available for nesting. Quality nesting cover is generally found in areas that are annually grazed by livestock at light grazing intensities or in areas that have received one or more years of rest (i.e. undisturbed habitat). Cover can become too tall and dense in the more productive prairies east of the planning area, but this is seldom a problem on most sites in the grasslands within the planning area. Greater prairie chicken productivity is maximized where quality nesting cover is provided over large areas, rather than as small islands or patches within a moderate or heavily grazed landscape. Nest densities and overall prairie chicken production in the planning area decrease as the nesting cover is reduced in height, density, and patch size. Most nest sites are selected and egg-laying initiated before significant spring plant growth, so residual cover from previous growing seasons is critical, especially during drought periods. There is also some evidence of nest-site fidelity by nesting hens. Providing traditional nesting areas, while recognizing the need for periodic but infrequent disturbance, is probably beneficial in enhancing prairie chicken production. Hens selecting nest sites also preferred pastures without livestock present. Although mid to tall, warm-season grass species are more rigid and better withstand snowpack, plant species composition of herbaceous nesting cover on the public rangelands in the planning area does not seem overly important. The exception to this generalization is where shortgrass species like blue grama dominate a potential mid or tall grass site because of extended heavy livestock grazing. In these cases, cover is usually insufficient to attract, conceal, or shelter a nesting hen.

Providing quality nesting cover on uplands rather than in lowlands subject to frequent flooding is also important. On the Sheyenne National Grassland, important nesting habitat occurs in the hummocky sandhills habitat association on mid and upland sites and on upland sites in the deltaic plain habitat association (Manske and Barker 1987). On the mid-grass prairies of the Fort Pierre National Grassland, nesting occurred primarily on rolling and flat uplands and seldom along lowland drainages (Rice and Carter 1984). However, unlike sharp-tailed grouse that frequently nest in the steeper hills, greater prairie chickens in the Nebraska sandhills nest primarily in the more productive valleys and meadows, including areas approaching a wetlands classification (Len McDaniel, personal communication, Kobriger 1964).

Other

Broods need some disturbed habitats (grazed, mowed, or burned) reasonably close to the nesting habitat. Broods seem to prefer areas disturbed in previous years and not during the current year. Quality brood habitat provides a mosaic of structural stages from tall and dense vegetation patches for shelter and protection to more open vegetation for ease of mobility and foraging on insects and succulent greens.

Prairie chickens roost on the ground in the night. Preferred vegetation structure at night roosts is mid and tall vegetation with an average visual obstruction reading greater than 8 inches (2.0 dm). Like sharp-tailed grouse, greater prairie chicken will use snow burrows for roosting when snow depths are adequate.

Most northern plains grasslands typically provide marginal high-energy winter foods for prairie chickens. Winter grains on private croplands including corn, sorghum and sunflower, are important winter staples, especially during periods of deep snow. However, in the Nebraska sandhills, winter grains are less critical, and it appears that some prairie chicken populations generally find sufficient high-energy foods such as rose hips in the native grasslands.

Conservation Planning

Apparently secure prairie chicken populations exist across much of the Nebraska sandhills including the Nebraska National Forest (Bessey Ranger District). Long-term trends in South Dakota populations are downward, but the prairie chicken population on the Fort Pierre National Grassland seems reasonably secure although the effects of future extended droughts on this population need to be closely monitored. Additional conservation planning to ensure viability appears to be currently unnecessary for these units.

Prairie chickens are essentially absent from the Samuel R. McKelvie National Forest even though there's potential habitat on the unit. There's also nearby huntable populations. A comprehensive conservation strategy to promote viable populations on this large public area has not been developed.

The species is protected yearlong in North Dakota, and a literature review and background study that addresses prairie chicken on the Sheyenne National Grassland has been recently prepared Svedarsky and Van Amburg (1999). This study includes a set of prairie chicken management recommendations, and efforts to develop a comprehensive conservation strategy by the Forest Service, North Dakota Game and Fish Department, and others to implement the recommendations are continuing. Another recent publication (Svedarsky et al. 1999) also sets out a strategy for conserving this species across its current range.

Direct and Indirect Effects on NFS Lands

Greater prairie chickens on NFS lands are most likely to be affected by vegetative management activities (livestock grazing, prescribed burning, and mowing).

Grazing

Livestock grazing during droughts can further reduce the quality and quantity of nesting, brooding and roosting cover thereby exasperating the negative effects of drought on prairie chicken habitat and populations. Annual livestock grazing at moderate and high grazing intensities can reduce and eliminate quality nesting cover. It can also encourage changes in plant species composition that reduce the ability of range sites to produce quality nesting cover, even in the absence of annual livestock grazing. Annual livestock grazing in planned grazing systems at light grazing intensities or of short duration can improve and maintain quality nesting and brooding habitat. Livestock grazing systems that combine periodic annual rest (undisturbed habitat) between periods of light to moderate grazing intensities can also improve the quality of nesting and brooding habitat. Livestock grazing can also influence predator populations, hunting efficiency of predators and ultimately prairie chicken survival and nest success.

Prairie dog foraging and clipping activity could reduce habitat suitability for prairie chicken nesting, brooding, and roosting.

Burning/Mowing

Prescribed burning and mowing can influence suitability of nesting and brooding habitat either favorably or negatively, depending on timing, location, and extent. Burning can help control development of undesirable woody vegetation in or near brooding, nesting, and roosting habitat.

Other

Continued spread of leafy spurge on the Sheyenne National Grassland will further deteriorate prairie chicken habitat, by both displacing native vegetation and increasing competition between prairie chickens and permitted livestock for a decreasing base of grassland vegetation. On the other hand, use of herbicides to reduce and control leafy spurge can reduce important forbs and other plants used by prairie chicken.

Human disturbance can cause disruption of breeding or abandonment of display grounds (Joslin and Youmans 1999, Westemeier and Gough 1999).

Since grasshoppers and other insects are important foods for prairie chickens and their broods, its possible that grasshopper spraying on rangelands could negatively impact prairie chicken populations.

Gallinaceous birds are vulnerable to grain-based rodenticides. Prairie chickens could be poisoned by rodenticides being used to reduce or eliminate prairie dog populations.

Cumulative Effects

The same impacts listed above under Direct and Indirect Effects are probably occurring or have the same or greater likelihood of occurring on private and state lands in the planning area. In addition, loss of native grasslands to cultivation continues on private lands (Ostlie et al. 1997, USDA Forest Service 2000, Chuluun et al. 1997). The continued loss of native grasslands on private land has been substantial in the vicinity of the Sheyenne National Grassland, and much of the new cropland is being allocated to potato production that provides no value to prairie chickens. Coyote reductions on the Sheyenne National Grassland to reduce losses to permitted

livestock and livestock on adjoining private lands can indirectly result in increases in red fox, a more serious threat to prairie chicken (Svedarsky and Van Amburg 1999).

Most meadows on private sandhill ranches are mowed annually for hay production and the stubble is then sometimes grazed by livestock. Although this may be beneficial for greater prairie chicken broods, it can reduce the amount of quality nesting habitat below critical levels if other quality nesting cover is not available in adjoining areas.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

Westemeier and Gough (1999) recommended the following:

- Conduct annual monitoring of display grounds.
- Strive for minimum viable populations with >100 males, but preferably >250 booming males.
- A grassland:cropland interspersion ratio of 75:25 on the landscape is generally ideal.
- Maintain grasslands, particularly with the use of prescribed burning, light-to moderate intensity rotation grazing, and / or high mowing.
- At least 30% of the habitat within 1-2 miles of key booming rounds should have Visual Obstruction Readings of 2.0 dm (8 inches).
- Remove tree lines (such as tree rows) from fragmented grasslands.

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

SNG, FPNG, NNF (BRD), SRMNF

- Modify livestock grazing practices as needed to reduce adverse impacts of drought to food and cover for prairie grouse and other wildlife. (Objective and Standard)
- Delay mowing of grasslands until July 15 or later to protect ground-nesting birds (Guideline).
- Manage for native forb abundance and diversity to provide foraging habitat for big game, grassland birds, and other grassland wildlife (Guideline).
- Manage for high structure habitat in large blocks in proximity to prairie grouse display grounds (Guideline).
- Limit activities within 1.0 mile of active great prairie chicken display grounds from March 1 to June 15 to prevent adverse effects on reproductive success. (Standard, Guideline)
- Manage prairie grouse display ground viewing activities to reduce disturbance and adverse impacts to the birds on the display grounds (Guideline).

SNG, FPNG, NNF (BRD), SRMNF, cont.

- Emphasize quality nesting and brooding habitat within 1.0 mile of active greater prairie chicken display grounds (Guideline).
- Identify or establish reference areas to help determine potential habitat capability for this species at the local area (management indicator species) (Objective).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

FPNG, NNF (BRD), SRMNF

- Design and implement livestock grazing strategies that provide quality nesting and brooding habitat on at least 30% of the area within 1.0 mile of active display grounds (Standard).

Geographic Area Direction (Chapter 2)

SNG, FPNG, NNF (BRD), SRMNF

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).
- Provide diverse and quality nesting, brooding, and roosting habitat for greater prairie chickens at levels that, in combination with habitat on adjoining lands, helps support a stable to increasing population of at least 250 adult male prairie chickens within 10 to 15 years on the Sheyenne National Grassland (Objective).
- Objectives are provided for prairie chicken habitats and to maintain stable to increasing population trends.
- Emphasize management for greater prairie chicken in the southern and western portion of the Sheyenne Geographic Area (Guideline).
- Manage for high vegetative structure in areas where it would enhance greater prairie chicken nesting habitat quality (Guideline).
- Manage for high plant species diversity, including forbs, in areas where it would enhance greater prairie chicken brooding habitat quality. Emphasize areas in proximity to nesting habitat (Guideline).
- Establish and maintain quality foraging habitat for greater prairie chicken and associated species by enhancing and / or maintaining a diversity of forbs (Guideline).
- Provide habitat at levels that will support a viable population of at least 250 adult male prairie chickens on the Sheyenne National Grassland over the next 10 to 15 years (Objective).
- Provide habitat at levels that will support a viable population of at least 250 adult male prairie chickens on the Samuel R. McKelvie National Forest over the next 10 to 15 years (Objective).
- At the onset of drought evaluate the need to modify livestock grazing practices to reduce adverse impacts of drought on fodd and cover for prairie grouse and other wildlife (Standard).

Management Area Direction (Chapter 3)

SNG

- The proposed Fritillary Prairie and Platanthera Prairie RNAs provide habitat for greater prairie chicken. RNAs will be managed to protect their ecological values. Management plans will be completed within 5 years (Objective).
- In selected areas allocated to MA 3.66, initiate intensive restoration efforts to meet desired conditions that include active and passive methods. Native reseeding projects may be initiated with local seed sources (Guideline).

FPNG

- The proposed Mallard South RNA (1,030 acres) provides habitat for greater prairie chicken. This RNA will be managed to protect its ecological values. A management plans will be completed within 5 years (Objective).

SRMNF

- The 2,500-acre Steer Creek proposed RNA provides some of the best potential habitat for greater prairie chicken restoration. RNAs will be managed to protect their ecological values. Management plans will be completed within 5 years.

Monitoring Direction (Chapter 4)

SNG, FPNG, NNF (BRD), SRMNF

- Continue monitoring populations and habitat.
- Monitor reference areas to help determine potential habitat capability at the local level.
- Monitor the effectiveness of the suggested stocking rates in Appendix I in meeting desired vegetation composition and grassland structure levels.

Appendices

SNG, FPNG, NNF (BRD), SRMNF

- Appendix H provides a description of quality habitat for this species. This appendix is referenced by a standard under unit-wide direction (Chapter 1) to provide quality habitat for management indicator species.
- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

SNG

Greater prairie chickens will be impacted by proposed activities, especially proposed livestock grazing. The direction to increase native forbs, increase high structure, and use rest pastures, as well as the direction to limit disturbance of displaying and nesting birds, will improve the species viability over current conditions. Overall, the determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

The greater prairie chicken population on this national grassland is threatened by low numbers, but habitat is available. A population viability outcome score of III has been assigned because significant gaps in the historic distribution occur, and these gaps are likely permanent. Habitat enhancement will be necessary, while reintroduction may also be needed. Such reintroductions have occurred, and succeeded.

FPNG, NNF (BRD)

The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Outcome II is selected as the risk assessment for this species on these areas. Habitat suitability for greater prairie chickens is expected to be enhanced due to lighter livestock grazing intensities, additional ungrazed acres, and more high structure grasslands. Management direction also calls for needed adjustments in livestock grazing levels during drought periods. Prairie chickens on both units are part of larger populations that extend beyond NFS boundaries, and any unoccupied suitable habitat would be repopulated through dispersal.

The amount of prairie dog colony expansion expected on the Fort Pierre National Grassland over the next 10 years (see prairie dog evaluation in Section 3 of this document) is not expected to have an adverse impact on prairie chicken populations on the planning unit. In fact, it is possible that up to some point, additional prairie dog colony expansion and the resulting enhanced habitat diversity could possibly be beneficial to prairie chickens. Currently, less than 1 percent of the potential prairie chicken habitat on the planning unit is affected by prairie dog foraging and clipping. In 10 years, the percent of potential prairie chicken habitat expected to be impacted by prairie dogs is projected to be between 1 and 2 percent. However, it is acknowledged that continued colony expansion over the next 2 decades or longer would most likely begin having adverse impacts on prairie chicken habitat and populations on the Fort Pierre National Grassland.

SRMNF

The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Outcome III is selected as the risk assessment for greater prairie chicken populations on this area under Alternative 3. Habitat suitability for greater prairie chickens is expected to be enhanced due to lighter livestock grazing intensities, additional ungrazed acres, and more high structure grasslands. Management direction also calls for needed adjustments in livestock grazing levels during drought periods. If good and timely progress is made in meeting the desired vegetation composition and structure objectives, it is expected that the much of the new and improved habitat will attract birds through dispersal from prairie chicken

populations around the national forest. However, some reintroductions may be needed in some areas to help meet population objectives for the species.

Yellow-billed Cuckoo (*Coccyzus americanus*)

Species Description

Yellow-billed cuckoos are 12 inches long, grayish-brown on the back and upper tail, and whitish below. The lower mandible is yellow. A rufous patch on the primaries is evident in flight. The subspecies to be expected in the planning area is *C. a. americanus*.

This species' breeding season begins in late March to late May. It builds its stick platform nest in a tree or bush, about 2-20 feet above the ground. Usually 3-4 eggs are laid, which are then incubated for 9-11 days. The young move out of the nest in 7-8 days, but cannot fly until about 21 days of age (Baicich and Harrison 1997).

The yellow-billed cuckoo forages among leaves for caterpillars, which comprise the bulk of their diet. This bird also eats other insects, spiders, small fruits, and other small animals, such as lizards and frogs (DeGraaf et al. 1991).

Distribution and Status

Yellow-billed cuckoos breed from California and northern Utah to southwestern Quebec and southern New Brunswick, south to southern Arizona and into Mexico. The species winters in South America (DeGraaf et al. 1991).

In the planning area, the yellow-billed cuckoo is a rare migrant on the Thunder Basin National Grassland, and Nebraska National Forest. Limited suitable nesting habitat is available on the Thunder Basin planning unit.

The yellow-billed cuckoo is still relatively common in much of the southeastern United States but has declined greatly in many portions of the west. Breeding Bird Survey data indicate a significant population decline of 1.6%/year from 1966-1996. Western populations of this species deserve special attention (NatureServe 2000). Population declines are associated with loss of native riparian habitat in the west.

Organization Rankings

The yellow-billed cuckoo is classified as a sensitive species in Region 2 of the Forest Service. It has been assigned a global conservation rank of G5 by the International Network of Natural Heritage progams and Conservation Data Centeres. A G5 rank is for taxa that are demonstrably widespread, abundant, and secure globally.

Habitat

Yellow-billed cuckoos favor moderately dense thickets near watercourses, as well as second growth woodlands. It avoids very dense woods. In the planning area, they nest in relatively large cottonwood riparian habitats (Oakleaf et al. 1996). It is also less apt to be found in altered habitats such as riparian areas within cultivated landscapes (Peterson 1995). The presence of low dense shrubby vegetation with abundant prey populations is an important habitat feature (DeGraaf et al. 1991).

Based on information presented in the FEIS, the amount of existing riparian habitat on each of the planning units is as follows:

Planning Unit	Miles of Streams and Rivers	Acres of Riparian Habitat
LMNG	189	40,100
GR/CRNG	41	1,700
SNG	9	3,800
FPNG	28	150
BGNG	101	7,600
ONG	11	1,200
NNF(PRRD)	30	3,700
NNF (BRD)	5	100
SRMNF	24	1,100
TBNG	99	7,200

The data in the above table does not include riparian habitat associated with ponds and lakes. It also only represents riparian habitat associated with perennial streams and rivers and does not include forested habitats associated with intermittent water courses. The amount of this riparian habitat that is suitable for yellow-billed cuckoos is unknown.

Conservation Planning

Statewide or regional habitat conservation strategies have not been prepared for this species.

Direct and Indirect Effects on NFS Lands

Livestock grazing can reduce shrubby undergrowth in riparian areas.

Cumulative Effects

Impacts to cuckoo habitats also occur on non-National Forest System lands in the planning area, and are largely due to grazing, agricultural development, dam construction, road construction, and urban sprawl (Ostlie et al. 1997, USDA Forest Service 2000, Chuluun et al. 1997).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

Conservation measures suggested in the scientific literature (summarized in NatureServe 2000), include:

- Improve riparian habitats.
- Remove livestock grazing to allow natural regeneration of cottonwoods and willows.

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

LMNG, GR/CRNG, BGNG, ONG, TBNG, NNF (BRD), SRMNF

- Design and implement livestock grazing strategies to provide for thick and brushy understories and multi-story and multi-age structure in riparian habitats, wooded draws, and woody thickets, contingent on local site potential (Guideline).
- Manage livestock grazing to maintain or improve riparian / woody draw areas (Guideline).
- Implement management practices that will move at least 80% of riparian and wooded draw areas toward self-perpetuating tree and shrub regeneration (Objective).
- Conduct actions so that habitats are maintained or improved toward robust stream health (Standard).

Geographic Area Direction (Chapter 2)

- None

Management Area Direction (Chapter 3)

TBNG

- The 5,980-acre Cheyenne River Zoological Special Interest Area (MA 2.1) provides a management emphasis on riparian habitats. This area possibly provides potential nesting habitat for this species.

SRMNF

- The 2,690-acre special plant and animal habitat (MA 3.64) along Steer Creek provides a management emphasis on riparian habitats. This area may provide potential nesting habitat for this species.

LMNG

- The proposed Little Missouri River RNA provides a management emphasis on healthy riparian habitats. This area may provide potential habitat for the yellow-billed cuckoo. RNAs will be managed to protect their ecological values. Management plans will be completed within 5 years (Objective).

Monitoring Direction (Chapter 4)

LMNG, GR/CRNG, BGNG, ONG, NNF (PRRD), TBNG, NNF (BRD), SRMNF

- Monitor populations and habitat.
- Monitor the extent that riparian area vegetation is regenerating.

Biological Determinations, Risk Assessments, and Rationale

LMNG, GR/CRNG, SNG

Biological determinations are not made for this species on these areas since it is not listed as sensitive by Region 1 of the Forest Service. The conservation measures listed above are expected enhance its habitat and/or protect the species and its habitat from possible adverse effects of Forest Service authorized activities and allocations.

BGNG, ONG, TBNG, NNF (PRRD), NNF (BRD), SRMNF

The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide". Outcome II is the selected risk assessment. Management direction clearly promotes regeneration of cottonwood riparian habitats across at least 80% of this habitat type on these planning units. Even when considering the impacts of Angustora Reservoir on the downstream cottonwood forests, there's probably more cottonwood and understory vegetation along the Cheyenne River today than in historical times just prior to European occupation of this region. Although populations of this species appear to be very limited in or near these areas, it's likely that suitable but unoccupied habitats could be filled through dispersal.

Long-billed Curlew (*Numenius americanus*)

Species Description

The long-billed curlew is a sickle-billed shorebird whose large bill distinguishes it from other shorebirds. Overall, the long-billed curlew is about 23 inches in size and cinnamon-brown above and buffy below, with brightly colored buffy wing linings.

The long-billed curlew nests on the ground in a shallow scrape. Egg-laying begins by early May in Saskatchewan. Clutch size is 3-5 (usually 4) eggs laid over 4-7 days. Incubation is by both sexes and lasts 28-30 days (Redmond and Jenni 1986). Nestlings are precocial. Young are tended by both parents and brooded at night for several days after hatching. Females usually depart when young are 2-3 weeks old; males tend young until fledging at 41-45 days

The long-billed curlew is fairly opportunistic, feeding on various insects (grasshoppers, beetles, caterpillars, etc.) and some berries. During migration, the bird also feeds on crayfishes, crabs, snails, and toads. The species may obtain insect larvae by probing into loose soil (Allen 1980). Predation on nestling birds has been observed.

Distribution and Status

Distribution

Long-billed curlews breed from interior British Columbia and southern Alberta through southern Manitoba, south to central California, and east to western North Dakota, central South Dakota, central Nebraska, western Kansas, northeastern New Mexico, and northern Texas (National Geographic Society 1987). The species winters in central California, along the Texas coast, and in Mexico.

Long-billed curlews arrive on the breeding grounds from about mid-March through May and depart for the wintering grounds from August to October. In some areas, fall departure may begin as early as June or July (Allen 1980), especially by unsuccessful breeders (Allen 1980, Paton and Dalton 1994). Peak breeding season in North Dakota is early May through early June (Stewart 1975).

Table H-6 summarizes species occurrence and status in the planning area. The long-billed curlew is known or may possibly occur on the Little Missouri, Grand River and Cedar River, Thunder Basin, Buffalo Gap, and Oglala National Grasslands; and Nebraska (Bessey Ranger District) and Samuel R. McKelvie National Forests.

Status

The status of long-billed curlews varies by population. The North American Breeding Bird Survey (BBS) indicates a non-significant decline for 1966-1996 across the species' range (-1.5 percent annual change, P = 0.13; n = 221; Sauer et al. 1997). Significant decline, however, was recorded for the planning area (see U.S. Fish and Wildlife Service Region 6,–3.3%, P=0.04, n=93; Sauer et al. 1997), while significant increases were recorded for populations further west.

Organization Rankings

The long-billed curlew is classified as a sensitive species by Region 2 of the Forest Service. The species has been assigned a G5 ranking by the International Network of Natural Heritage programs and Conservation Data Centeres. A G5 rank is for taxa that are demonstrably widespread, abundant, and secure globally. The long-billed curlew's rankings in the United States are similar (N5). The long-billed curlew is considered Moderately High Priority on the 1998 Watch List (Carter et al. 1998), but is listed as High Priority for Wyoming, North and South Dakota, and Nebraska. Population declines in eastern Wyoming have been significant (Oakleaf et al. 1996).

Habitat

General

In summer, long-billed curlews use expansive, open, level to gently sloping or rolling grasslands with short vegetation such as shortgrass prairie or recently grazed mixed-grass prairie (Graul 1971, Stewart 1975, Johnsgard 1980, Bicak et al. 1982, Cochran and Anderson 1987, Eldridge 1992, Oakleaf et al. 1996, Gillihan and Hutchings 2000). Preference for areas in which vegetation density is concentrated near ground level may be important in terms of the feeding behavior of long-billed curlews or their ability to see potential predators.

The acres of flat to gently rolling grassland habitat on each of the planning units, based on vegetation and slope (less than 10%), are as follows:

Planning Unit	Acres of Potential Grassland Habitat
LMNG	323,000
GR/CRNG	89,100
FPNG	89,500
BGNG	361,500
ONG	69,100
NNF (BRD)	4,000
SRMNF	31,000
TBNG	92,300

The amount of this habitat that is currently suitable for curlews on each area is unknown.

Nest

Long-billed curlew commonly nest in wet and dry prairie and in pastures. The species rarely nests in hayland, cropland, fallow, or stubble fields (McCallum et al. 1977, Renaud 1980, Cochran and Anderson 1987, Shackford 1994).

Proximity to water may be an important factor in habitat selection (McCallum et al. 1977, Cochran and Anderson 1987, King 1978, Oakleaf et al. 1996). Shackford (1987) suggested that a drop in the water table in the panhandle of Oklahoma caused long-billed curlews to favor areas near irrigated fields over upland, shortgrass sites. Because curlews are known to return to the same area to nest each year regardless of whether water is still available, curlews may be found nesting far from water if water sources have disappeared (McCallum et al. 1977).

In the Platte River Valley of Nebraska, long-billed curlews nested at higher densities in wet meadows than in upland prairie (Faanes and Lingle 1995). Within the sandhill grasslands of Nebraska, proximity of mixed-grass uplands to wet meadows was the most important criterion in nest-site selection (Bicak 1977). Wet meadows were used for feeding, loafing, and fledging young and were aggressively defended (Bicak 1977). Curlews in Nebraska also nested on upland slopes of native vegetation near moist meadows that were used for foraging (Johnsgard 1980). In North Dakota, long-billed curlews nested on grazed mixed-grass and on shortgrass prairie (Stewart 1975). Curlews preferred gently rolling terrain with gravelly soils. In Wyoming, nest sites were characterized by less bare ground and higher percent cover of grasses (values were not given) than random sites within hayfields and pastures that contained nests (Cochran and Anderson 1987).

Nests often are located near cowpies or other conspicuous objects, possibly for concealment (Silloway 1900, King 1978, Johnsgard 1979, Allen 1980, Cochran and Anderson 1987). Additionally, nests often occur on hummocks, possibly to improve visibility of predators and to prevent flooding in otherwise level fields (Cochran and Anderson 1987).

Habitat characteristics of the landscape surrounding nest sites also influence long-billed curlew populations (King 1978, Allen 1980, Pampush and Anthony 1993). After eggs hatch, adults and broods continue to forage in shortgrass and mixed-grass habitats, but they increase their use of areas with more vegetative cover (e.g., cropland, stubble fields, and weedy areas) (King 1978; Allen 1980; Pampush and Anthony 1993), particularly if vegetation is sparse at the nest site. Use of areas with tall, dense vegetation may have provided chicks with an important source of shade or concealment cover (King 1978, Pampush and Anthony 1993). In central South Dakota, long-billed curlews with chicks were reported in grass that was 7 inches (18 cm) tall (Spomer 1981).

Forage

Curlews forage in grasslands, cultivated fields, stubble fields, wet meadows, prairie dog colonies, and occasionally along wetland margins (Silloway 1900, Johnsgard 1980, Shackford 1987).

Conservation Planning

There is no state or regional conservation plan for long-billed curlew.

Direct and Indirect Effects on NFS Lands

Grazing

Although livestock grazing can result in nest loss due to trampling (Redmond and Jenni 1986), and disturbance to nesting birds (Cochran and Anderson 1987), livestock grazing would generally be beneficial to long-billed curlew in the planning area. This is because livestock grazing can provide the short vegetation, particularly during the pre-laying period, that is preferred by curlews (Bicak et al. 1982, Cochran and Anderson 1987, Bock et al. 1993, Oakleaf et al. 1996).

In Nebraska, curlews were present on grazed areas and were absent from ungrazed areas (Cole and Sharpe 1976). Long-billed curlews in southern Alberta used only continuously grazed mixed-grass pasture and were absent from mixed-grass pasture grazed in early summer, spring-grazed tame pasture, and deferred-grazed (grazed after 15 July) mixed-grass pasture (Prescott et al. 1993). In northwestern South Dakota, long-billed curlews were seen either in pastures with cattle or in unoccupied pasture; no curlews were observed in pastures with sheep (Timken 1969).

Burning

Burning can improve habitat for long-billed curlews by removing shrubs and increasing habitat openness (Pampush and Anthony 1993). During the breeding season following a fall range fire, there was a 30% increase in the estimated curlew breeding density in western Idaho (Redmond and Jenni 1986).

Mowing

Haying can be used to provide the short vegetation preferred by nesting curlews, but should be timed so that short vegetation is available early in the season and active nests are not damaged (Cochran and Anderson 1987, Oakleaf et al. 1996). In Alberta, however, long-billed curlews did not use haylands (Prescott 1997).

Other

Pesticides can be detrimental to long-billed curlews, both directly and indirectly, by affecting prey availability (Blus et al. 1985).

Human activities and disturbance can cause nest abandonment (Joslin and Youmans 1999).

Cumulative Effects

Continued conversion of rangeland to croplands can be expected to occur on private lands across the planning area's short and mixed grass prairies, to the detriment of long-billed curlews (Ostlie et al. 1997, USDA Forest Service 2000, Chuluun et al. 1997). The absence of prescribed fire on private land is likely to continue, thereby reducing quality nesting habitat opportunities for the long-billed curlew.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. These agreements are long term and collectively cover virtually all land suitable for grazing which are also the lands suitable for the long-billed curlew. The extensive areas under grazing permits limit opportunities for prescribe burning large areas.

Conservation Measures and Mitigation

Keys to management include providing large, open, level to gently rolling grasslands with short vegetation, and tailoring grazing regimes to local conditions. The U.S. Geological Survey has developed several management recommendations for the long-billed curlew (Dechant et al. 2000), relevant to national grassland and forest management:

- Protect breeding habitat of curlews from detrimental human activities, such as vehicular use, researcher disturbance, and shooting (Sugden 1933, Redmond and Jenni 1986).
- Tall, dense residual vegetation should be removed before the pre-laying period (March to April) so that adults do not have to leave their territories to forage (Redmond 1986). Removal of residual vegetation is especially important after years of above-normal precipitation. Haying and grazing can be used to provide the short vegetation and reduced vertical plant density preferred by nesting curlews, but should be timed so that short vegetation is available early in the season (Cochran and Anderson 1987).
- Burn areas where fire will improve habitat by reducing shrub coverage and increasing habitat openness (Redmond and Jenni 1986, Pampush and Anthony 1993).
- Adjust timing and intensity of grazing treatment according to environmental factors (Bicak et al. 1982, Cochran and Anderson 1987, Bock et al. 1993).
- Avoid grazing during the incubation period; in Wyoming, nests in areas that were grazed during incubation had lower hatching success rates than nests in other areas (Cochran and Anderson 1987).

Gillihan and Hutchings (2000) also provide recommendations for managing this species and its habitat.

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

LMNG, GR/CRNG, TBNG, BGNG, FPNG, ONG, NNF (BRD), SRMNF

- Delay mowing of grasslands until July 15 or later to protect ground-nesting birds (Guideline).
- Restrict prairie dog shooting where significant risks have been identified for other wildlife species (Guideline).

Geographic Area Direction (Chapter 2)

LMNG, GR/CRNG, TBNG, BGNG, FPNG, ONG, NNF (BRD), SRMNF

- Objectives call for a more diverse grassland vegetation mosaic through desired seral stages and vegetation structure (see tables in Section 5).
- Objectives are established for the use of prescribed fire.

Management Area Direction (Chapter 3)

BGNG

- Allocation of the 12,030 acre Rake Creek backcountry non-motorized area (MA 1.31) contains ideal habitat for long-billed curlews. This allocation will help maintain low levels of human disturbance due to motorized access.
- Allocation of the 9,540-acre swift fox special interest area contains ideal habitat for long-billed curlew. A diverse vegetation mosaic is prescribed for this area, and this will help provide quality nesting, brooding and foraging habitat for curlews.

Monitoring Direction (Chapter 4)

LMNG, GR/CRNG, TBNG, BGNG, FPNG, ONG, NNF (BRD), SRMNF

- Monitor populations and habitat.

Biological Determinations, Risk Assessments, and Rationale

TBNG, BGNG, FPNG, ONG, NNF (BRD), SRMNF

Long-billed curlews require a diversity of grassland structure: very short grass for nesting sites and taller vegetation for brood habitat. Because of the direction emphasizing increasing vegetative structural diversity, habitat conditions will likely improve over that currently existing. Expected increases in prescribed fire acreage and prairie dog towns will also benefit long-billed curlews. The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Outcome II is the selected risk assessment. Habitat is well distributed and of sufficient quality to maintain the species' presence, but some concern is warranted due to population declines noted throughout the planning area. This species is capable of long dispersal and repopulating suitable but unoccupied habitats.

LMNG, GR/CRNG

Biological determinations are not made for this species on these areas since it is not listed as sensitive by Region 1 of the Forest Service. The conservation measures listed above are expected enhance its habitat and/or protect the species and its habitat from possible adverse effects of Forest Service authorized activities and allocations.

Northern Goshawk (*Accipiter gentilis*)

Species Description

The goshawk is the largest (21-26 inches long) North American member of the genus *Accipiter*. Adults have blue-gray backs and whitish underparts with dense gray barring. Immature goshawks are dark brown above and buffy below, with thick streaks of dark brown.

The subspecies in the planning area is *A. g. atricapillus,* and is the focus of the following discussion.

Northern goshawks nest in large stick nests placed in trees. Goshawks occasionally use nests built by other species. One to four eggs are laid, and incubated for about 38 days. Young leave the nest at 43-50 days of age, but remain dependent on their parents for another 6-8 weeks.

This species preys on medium to large birds and small mammals, including American robins, woodpeckers, tree squirrels, and grouse (Squires and Reynolds 1997).

Distribution and Status

Northern goshawks breed from western and central Alaska and northern Yukon to Labrador and Newfoundland, south to southern Alaska, central California, southern New Mexico, western South Dakota, northern Minnesota, and northwestern Connecticut, and in the northern Appalachian Mountains (DeGraaf 1991). They winter in or near their breeding range as well as disperse southward into the Great Basin, Great Plains, and the eastern United States.

Table H-6 summarizes species occurrence and status in the planning area. The species is known to occur, possibly as a breeder, on the Thunder Basin National Grassland, and is known or may possibly occur as a winter migrant on the Nebraska National Forest (PRRD) and Oglala, Buffalo Gap, Fort Pierre, Grand River/Cedar River, Little Missouri and Sheyenne National Grasslands. However, no nesting is known to occur on the NFS units in the planning area.

From a global scale, the northern goshawk is still relatively abundant and widespread, though population trends are difficult to determine. Breeding Bird Survey and Christmas Bird Count data do not show significant changes in populations in recent decades. Counts from migration monitoring stations are complicated by normal population fluctuations resulting from periodic invasions of large numbers of birds (NatureServe 2000).

Organization Rankings

The northern goshawk has a global ranking of G5 and a national ranking of N4 (NatureServe 2000). It is classified as a sensitive species in Regions 1 and 2 of the Forest Service.

Habitat

The northern goshawk is a forest habitat generalist that uses a wide variety of forest conditions. Nests in the planning area are primarily in mature, dense ponderosa pine stands with canopy closures of 60 to 85% and at least 120 square feet basal areas (Erickson 1987, Bartelt 1977, Phillips et al. 1990, Phillips and Beske 1990). Nest trees in the Black Hills ranged from 8 to 16 inches diameter at breast height. As many as 2 to 4 alternate nests may be used by pairs, and some nests may not be used for several years and then reused. Although nest sites are usually located in dense forest stands, they also tend to be near a forest opening or road (Erickson 1987, Speiser and Bosakowski 1987, Bartelt 1977). The amount of ponderosa pine habitat on the Nebraska National Forest (Pine Ridge Ranger District) and Thunder Basin National Grassland is approximately 22,000 and 10,000 acres, not including over 10,000 acres of additional forests that have burned over the last 3 decades on the Nebraska area.

Goshawks hunt in various habitats including open sagebrush and grasslands, riparian, deciduous forests and coniferous forests. Since goshawks need relatively open understories for efficient hunting (Speiser and Bosakowske 1987, Oakleaf et al. 1996), denser understories can reduce foraging habitat quality in forested environments.

A more detailed and expanded discussion of habitat needs for this species is presented in the Biological Assessment and Evaluation for the revised Black Hills National Forest LRMP (USDA 1996).

Conservation Planning

A statewide or regional habitat conservation strategy has not been prepared for *A. g. atricapillus.*

Direct and Indirect Effects on NFS Lands

Disturbance during the nesting period can cause reduced reproductive success and nest abandonment (Reynolds et al. 1992, Bartelt 1977, Joslin and Youmans 1999, Romin and Muck 1999). Reynolds et al. (1992) recommended minimizing human presence until young leave the area (approximately March 1 through September 30).

Timber management could result in destruction of nests and alteration of foraging habitat and prey availability.

Fire suppression has caused many ponderosa pine stands to become denser with considerably more trees in the understory, to the detriment of goshawk foraging habitat quality. In addition, the increased ladder fuels translate into a greater potential for stand-replacing fires and thus potential loss of goshawk nesting habitat.

Vegetation management projects, including livestock grazing, could reduce prey availability for migrating or breeding goshawks.

Cumulative Effects

The impacts listed above under Direct and Indirect Effects also occur on other land jurisdictions in the planning area. Additional impacts to northern goshawks elsewhere in Wyoming, North and South Dakota and Nebraska are more widespread timber harvest and increased disturbance to nesting birds due to a lack of spatial and temporal buffers, and the lack of diverse foraging habitat on rangeland due to low diversity of vegetative structure and composition.

Interrelated and Interdependent Actions

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development and additional roads, traffic and pipelines. Determining ponderosa pine forests to be within the suitable timber base can result in pre-commercial thinning and commercial timber sales.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

TBNG

- Manage livestock grazing to maintain or improve riparian areas. (Guideline)
- Prohibit above-ground oil and gas facilities within 0.5 mile of active raptor nests. (Standard)
- Restrict activities (seismic, prescribed burning, construction, etc.) within 0.5 mile of active raptor nests. (Guideline)

Geographic Area Direction (Chapter 2)

TBNG

- Objectives call for a more diverse grassland vegetation mosaic through rest, desired seral stages and vegetation structure (see tables in Section 5).
- Objectives are established for the use of prescribed fire.
- During vegetation management projects, use methods that emphasize development of structural stages 4 and 5. The longterm objective is to have approximately 40% of the forest cover in structural stage 4 and 20% in structural stage 5 (Objective).
- Fire will be reintroduced as determined by project specific resource needs (Objective).
- Management activities should replicate natural biological processes and vegetative patterns and patch sizes (Guideline).
- During vegetation management projects, maintain an average of 4 snags per forested acre (Standard).
- Retain all soft snags unless they are a safety hazard (Guideline).
- When necessary to meet the minimum snag standard, create snags from live tree replacement (Guideline).

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

TBNG

- Monitor populations (evidence of nesting) and habitat.

Biological Determinations, Risk Assessments, and Rationale

TBNG

The biological determination for goshawks that migrate through this area is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." The biological determination for breeding and nesting goshawks in the area would have to be “no impact” since recent nesting has not been confirmed.

Outcome 1 or 2 is the selected risk assessment for this species on this area. No commercial timber sales are planned for potential nesting habitat in the ponderosa pine forests on this national grassland. No projects that would reduce prey availability across extensive areas of this national grassland are planned.

Greater Sage Grouse (*Centrocercus urophasianus*)

Species Description

The greater sage grouse is the largest grouse in North America. Adults are grayish-brown overall, with black belly patches and spike-like tail features. Males (26-30 inches in length) have black throats, white breasts, and are considerably larger than females. Females have white throats and are approximately 22 inches in length. Like several other grouse species, greater sage grouse utilize communal display grounds for courtship and breeding.

The American Ornithologists’ Union officially split the sage grouse into two species, the greater sage grouse and Gunnison’s sage grouse, in summer 2000. The species that occurs in the planning area, the greater sage grouse, is the focus of this account.

Greater sage grouse nest on the ground, most often below sagebrush. A typical clutch has 7 or 8 eggs, which are incubated by the female for 25 to 27 days. The nestlings are precocial, and leave the nest as soon as their down is dry. Some re-nesting may occur if the first nest is destroyed.

Greater sage grouse feed on soft material, mostly sagebrush during the winter, and a combined diet of sagebrush and various forbs during the spring and summer. Sage grouse are unique in that they lack a muscular gizzard like other gallinaceous birds and cannot grind and digest seeds (Wallestad 1975). Juveniles initially consume a diet of forbs and invertebrates (Johnson 1987).

Distribution and Status

Greater sage grouse are found from central Washington, southern Idaho, Montana, southeastern Alberta, southwestern Saskatchewan, North Dakota, and western South Dakota, south to eastern California, south-central Nevada, southern Utah, and Colorado (DeGraaf et al. 1992). Some populations are migratory, moving several miles to wintering range. Those on the planning units however, are believed to be nonmigratory.

Table H-6 summarizes species occurrence and status in the planning area. Greater sage grouse occur on the Little Missouri, Buffalo Gap (Fall River County), and Thunder Basin National Grassland. At least 26 active sage grouse display grounds have been documented over the last several years on private and public lands within the administrative boundary of the Little Missouri National Grassland. A total of approximately 50,000 acres of national grasslands occurs within a 2-mile radius of all the known display grounds. Within the 50,000 acres, there's approximately 16,000 acres of interspersed sagebrush and grassland. There's approximately 16,000 acres of interspersed big sagebrush and grassland habitat on the Buffalo Gap National Grassland, but only 1 display ground was located in 2,000. Only 9 males were observed on this display ground. On the Thunder Basin National Grassland, there's over 438,000 acres of interspersed sagebrush and grassland habitat and over 70 active display grounds have been observed over the last several years on private and public lands within the administrative boundary of the national grassland. Sage grouse are scattered throughout this habitat across the national grassland, with pockets of higher sage grouse densities.

This species historically occurred in at least 14 states and 3 provinces in western North America (Braun 1993). They are now extirpated from Arizona, Oklahoma, New Mexico, Kansas, Nebraska, and British Columbia. Populations in North and South Dakota are probably marginal, as are those in Colorado, California, Utah, and Washington. Secure statewide populations now occur only in Idaho, Montana, Nevada, Oregon, and Wyoming, although small population extinctions are probably occurring in those states (Braun 1993). Long-term trends in 5 states that monitor sage grouse production indicate that productivity has fallen 26% over the last 10 years (Connelly and Braun 1996).

Organization Rankings

The greater sage grouse is classified as a sensitive species in Region 1 of the Forest Service and is ranked as a G5 species, meaning "secure." The Partners in Flight program Watch List identifies the greater sage grouse as a "high priority" in South Dakota.

Habitat

Sagebrush shrubland is the habitat of the greater sage grouse. Sagebrush is the primary food of sage grouse during the summer and is almost the exclusive diet during winter. Almost all sage grouse activity occurs in sagebrush or in meadows or openings adjacent to sagebrush. Because of this, they are considered habitat specialists. Studies in Wyoming and other states have demonstrated that nesting sage grouse select for areas with > 20% canopy cover of big sagebrush and typically nest where the tallest sagebrush and tallest and densest grass occurs (Heath et al. 1996, Wakkinen 1992, Webb 1993, Sveum et al. 1998). Having tall and dense residual herbaceous cover left over from the previous growing and grazing season appears to be a critical habitat component since nest construction and egg-laying begins in April before spring growth. Young broods are typically found in areas with less canopy cover and more forbs but move to sagebrush in the fall. Optimum winter habitat includes areas with the tallest sagebrush where grouse can still find and forage on sagebrush during periods of deep snow. The sagebrush habitat for this species on the national grasslands is much less varied than is typical for montane populations of sage grouse, due to the flat to gently rolling topography and other factors. This may make the species and it's habitat on the northern plains more vulnerable.

Paige and Ritter (1999) provide a more detailed description of sage grouse habitat.

Conservation Planning

Connelly et al. (2000) developed guidelines for management of sage grouse populations and habitats. Peterson (1995) and Paige and Ritter (1999) also provide guidelines and recommendations for managing sagebrush habitat.

Direct and Indirect Effects on NFS Lands

Spraying sagebrush with herbicides can reduce habitat suitability for sage grouse due to loss of sagebrush and reduced abundance of preferred forb species (Paige and Ritter 1999).

Livestock grazing can cause unfavorable changes in plant species composition and structure on sagebrush dominated shrublands (Connelly et al. 2000, Heath et al. 1996, Wakkinen 1992, Webb 1993, Sveum et al. 1998, Paige and Ritter 1999).

Expanding prairie dog populations could reduce the amount of suitable nesting, brooding, and roosting habitat for sage grouse as the result of the additional prairie dog foraging and clipping.

Disturbance can cause disruption of breeding or abandonment of display grounds and impacts to nesting (Connelly et al. 2000, Joslins and Youmans 1999).

Since grasshoppers and other insects are important foods for sage grouse broods, grasshopper spraying on rangelands can negatively impact sage grouse populations (Arenz and Joern 1996, Ostlie et al. 1997, Johnson 1987).

Cumulative Effects

Sagebrush control, livestock grazing, and disturbance are also occurring on private and state lands in the planning area. Other cumulative effects include hunting, habitat loss, habitat fragmentation, and exotic species invasion. Grasshopper spraying on large blocks of private and state lands could also result in additional threats to sage grouse populations (Johnson 1987).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development and additional roads, traffic and pipelines.

Conservation Measures and Mitigation

Connelly et al. (2000) developed guidelines for management of sage grouse populations and habitats. Those most relevant to planning area National Grasslands include:

- Viewing sage grouse on display grounds should be done in a manner that minimizes disturbance to birds.
- Use appropriate vegetative management techniques (such as mechanical methods or fire) to remove junipers and other conifers invading sage grouse habitat.
- Avoid building tall structures within 2 miles of sage grouse habitats.
- Manage breeding habitat to support 15-25% canopy cover of sagebrush, 15% canopy cover of grasses, and >10% canopy cover for forbs. Perennial herbaceous cover should average >7 inches. Management should also focus on providing a diversity of forbs.

Conservation Measures and Mitigation, cont.

- Protect suitable habitats within 3 miles of occupied display grounds.
- During drought, reduce stocking rates or change management practices for livestock if nesting and brood rearing cover requirements are not being met.
- Suppress wildfires in all breeding habitats.
- Adjust timing of energy exploration, development, and construction to minimize disturbance to breeding sage grouse.
- Avoid removing sagebrush within 325 yards (300 m) of sage grouse foraging areas.
- Discourage use of highly toxic organophosphorus and carbamate insecticides in sage grouse brood-rearing habitat.
- Avoid developing springs for livestock water.
- Use brush beating, fire, or herbicides to create a mosaic of opening in areas with >35% total shrub cover, to improve brood-rearing habitat.
- Wherever possible, modify developed springs and other water sources to restore natural free-flowing water.

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

LMNG, TBNG

- Modify livestock grazing practices as needed to reduce adverse impacts of drought to food and cover for prairie grouse and other wildlife. (Objective and Standard)
- Delay mowing of grasslands until July 15 or later to protect ground-nesting birds, including their nests and young broods (Guideline).
- Manage for native forb abundance and diversity to provide foraging habitat for big game, grassland birds, and other grassland wildlife (Guideline).
- Manage for high structure habitat in large blocks to provide habitat for waterfowl, prairie grouse, and other ground-nesting birds (Guideline).
- Prohibit construction of new oil and gas facilities within 1/4 mile of active sage and sharp-tailed grouse display grounds (Standard).
- Limit construction or placement of non-oil and gas structures or facilities within 1/4 mile of active prairie grouse display ground if structures are likely to adversely affect reproductive success (Guideline).
- Limit activities within 2.0 miles of active sage grouse display grounds from March 1 to June 15 if they are likely to adversely affect the reproductive success (Guideline).
- Manage prairie grouse display ground viewing activities to reduce disturbances and adverse impacts to the birds on the display grounds (Guideline).
- Emphasize quality nesting and brooding habitat, consistent with GA objectives within 3 miles of active sage grouse display grounds (Guideline).

- Manage for late seral condition sagebrush in selected sagebrush stands to provide quality wintering habitat for sage grouse (Standard).
- Manage wet and sub-irrigated meadows, seeps, riparian habitats, and other wetland areas that occur in or adjacent to sage grouse habitat as key foraging areas during the spring, summer, and fall (Standard).
- Avoid prescribed burning in Wyoming big sagebrush habitat and in sage grouse wintering habitat unless it can be demonstrated to be beneficial for local sage grouse populations (Guideline).
- In sage grouse habitat, maintain small openings within larger sagebrush stands at a ratio of approximately 1 acre of openings to 3 acres of sagebrush (Guideline).
- Identify or establish reference areas to help determine local habitat potential for this species (management indicator species) (Objective).

LMNG

- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

BGNG

- Manage for native forb abundance and diversity to provide foraging habitat for big game, grassland birds, and other grassland wildlife (Guideline).
- Identify or establish reference areas to help determine local habitat potential for this species (management indicator species) (Objective).
- Modify livestock grazing practices as needed to reduce adverse impacts of drought to food and cover for prairie grouse and other wildlife. (Objective and Standard)

Geographic Area Direction (Chapter 2)

LMNG, BGNG, TBNG

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).
- Manage for high vegetative structure in areas where it would enhance sage grouse nesting habitat (Guideline).
- Objectives are provided for sage grouse habitats and to maintain stable to increasing population trends for this species.

BGNG

- At the onset of drought evaluate the need to modify livestock grazing practices to reduce adverse impacts of drought on food and cover for prairie grouse and other wildlife (Standard).
- Delay mowing of grasslands until July 15 or later to protect ground-nesting birds, including their nests and young broods (Guideline).

BGNG, cont.

- Manage for high structure habitat in large blocks to provide habitat for waterfowl, prairie grouse, and other ground-nesting birds (Guideline).
- Prohibit construction of new oil and gas facilities within 1/4 mile of active sage and sharp-tailed grouse display grounds (Standard).
- Limit construction or placement of non-oil and gas structures or facilities within 1/4 mile of active prairie grouse display ground if structures are likely to adversely affect reproductive success (Guideline).
- Limit activities within 2.0 miles of active sage grouse display grounds from March 1 to June 15 if they are likely to adversely affect the reproductive success (Guideline).
- Manage prairie grouse display ground viewing activities to reduce disturbances and adverse impacts to the birds on the display grounds (Guideline).
- Emphasize quality nesting and brooding habitat, consistent with GA objectives within 3 miles of active sage grouse display grounds (Guideline).
- Manage for late seral condition sagebrush in selected sagebrush stands to provide quality wintering habitat for sage grouse (Standard).
- Manage wet and sub-irrigated meadows, seeps, riparian habitats, and other wetland areas that occur in or adjacent to sage grouse habitat as key foraging areas during the spring, summer, and fall (Standard).
- Avoid prescribed burning in Wyoming big sagebrush habitat and in sage grouse wintering habitat unless it can be demonstrated to be beneficial for local sage grouse populations (Guideline).
- In sage grouse habitat, maintain small openings within larger sagebrush stands at a ratio of approximately 1 acre of openings to 3 acres of sagebrush (Guideline).

TBNG

- At the onset of drought evaluate the need to modify livestock grazing practices to reduce adverse impacts of drought on food and cover for prairie grouse and other wildlife. (Objective and Standard)

Management Area Direction (Chapter 3)

LMNG (MA 3.65)

- Most of the sage grouse habitat is allocated to MA 3.65 that emphasizes maintaining and restoring a diversity of vegetation conditions through uneven livestock grazing distribution; maintaining existing secondary and inaccessible rangelands; different livestock grazing intensities; and limiting further development of livestock grazing improvements (fence and water).

BGNG (MA 3.64)

- Most all of the sagebrush habitat (over 45,000 acres) are allocated to MA 3.64 to prioritize management of the sagebrush community for sage grouse, big game and other wildlife species. Numerous standards and guidelines emphasize the ecological and biological diversity values in this area.

TBNG (MA 3.65)

- Some of the primary sage grouse habitat is allocated to MA 3.65 that emphasizes maintaining and restoring a diversity of vegetation conditions through uneven livestock grazing distribution, different livestock grazing intensities, and limiting further development of livestock grazing improvements (fence and water).

Monitoring Direction (Chapter 4)

LMNG, BGNG, TBNG

- Monitor populations and habitat.
- Monitor reference areas to help determine potential habitat capability at the local level.
- Monitor the effectiveness of oil and gas stipulations in protecting this species and its habitat.
- Monitor the effectiveness of the suggested stocking rates in Appendix I in meeting desired vegetation composition and vegetation structure levels.

Appendices

LMNG, BGNG, TBNG

- Oil and gas stipulations in Appendix D are provided to reduce adverse effects to the species.
- Appendix H provides a description of quality habitat for this species. This appendix is referenced by a standard under unit-wide direction (Chapter 1) to provide quality habitat for management indicator species.
- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

LMNG

Management actions prescribed under Alternative 3 will result in added protection and improved sage grouse habitat. In addition, stricter regulation of disturbance-causing activities would occur. The emphasis on increasing forb diversity and high vegetative structure will be especially beneficial. Considering the likely effects of Alternative 3, the biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Outcome IV is the selected risk assessment for the sage grouse in this area. The rationale for this outcome is the very limited extent of suitable potential and suitable habitat on this unit. Also, this population is on the edge of the species' range and somewhat isolated due to permanent habitat gaps. Habitat enhancement, both on and off the planning units, is likely needed. Successful reintroductions have not been demonstrated for this species.

The amount of prairie dog colony expansion expected on the Little Missouri National Grassland over the next 10 years (see prairie dog evaluation in Section 3 of this document) is not expected to have an adverse impact on sage grouse populations on the planning unit. In fact, it is possible that up to some point, additional prairie dog colony expansion and the resulting enhanced habitat diversity could possibly be beneficial to sage grouse. Even after 10 years of expected colony expansion, less than 1 percent of the potential sage grouse habitat on the planning unit will likely be affected by prairie dog foraging and clipping. However, it is acknowledged that continued colony expansion over the next several decades could begin having adverse impacts on sage grouse habitat and populations on the national grassland.

TBNG AND BGNG

Biological determinations are not made for this species on these areas since it is not listed as sensitive by Region 2 of the Forest Service. The conservation measures listed above are expected to enhance its habitat and/or protect the species and its habitat from possible adverse effects of Forest Service authorized activities and allocations. Additional management direction also applies to this species since it is also a management indicator species.

Ferruginous Hawk (*Buteo regalis*)

Species Description

The ferruginous hawk is a large buteo, averaging about 23 inches long with a 53-inch wingspan. It has a rusty back and shoulders, a pale head, and a white tail washed with pale red. Two subpopulations of ferruginous hawk are recognized (Bechard and Schmutz 1995). The focus of this summary is the "central" population, found east of the Rocky Mountains.

Ferruginous hawks are opportunistic nesters in the planning area (Phillips and Beske 1990). Historically, the majority of nests were on or near the ground (dirt/rock/chalk outcrops, riverbed mounds, mud buttes, and rock piles); more recently, many nests have been built in trees and large shrubs, on utility structures, artificial platforms, roofs of abandoned buildings, and vertical river banks. Territory and nest site re-occupancy is common for ferruginous hawks, and one of several nests within a territory may be used in alternate years. Clutch size usually is two to four eggs. Incubation lasts about 32-33 days and is done mostly by the female, while the male provides food. Young fledge in 35-50 days, but the young depend on their parents for several weeks more.

Mammals are the primary prey during the breeding season, although birds, amphibians, reptiles, and insects also are taken (Dechant, et al. 1999, NatureServe 2000). Primary prey in central grasslands are ground squirrels, followed by pocket gophers and white-tailed jackrabbits (Bechard and Schmutz 1995). Primary prey in western shrub steppe is jackrabbits, followed by ground squirrels and pocket gophers (Smith and Murphy 1978, Bechard and Schmutz 1995). White-tailed and black-tailed prairie dogs also serve as prey items (Powers and Craig 1976, MacLaren et al. 1988). Black-tailed prairie dogs are active yearlong and where available, provide a reasonably stable food source throughout the year for raptors (Phillips et al. 1990).

Distribution and Status

Distribution

Ferruginous hawks breed from northeastern Washington, southern Alberta, and southern Saskatchewan, south to eastern Oregon, western Nevada, southern California, and northern Arizona, and east through northern Texas, western Oklahoma, and eastern North Dakota (National Geographic Society 1987). The species winters from the central and southern parts of its breeding range, into Mexico.

Ferruginous hawks occur on breeding areas from late February through early October (Weston 1968, Smith and Murphy 1978, Gilmer and Stewart 1983, Schmutz and Fyfe 1987, Bechard and Schmutz 1995). Adults depart the northern end of their breeding range by late October; young depart in August. Wintering areas of grassland and desert shrub breeders are mainly separate (Schmutz and Fyfe 1987).

Table H-6 summarizes species occurrence and status in the planning area. Ferruginous hawks occur on all planning units, except the Sheyenne National Grassland.

Status

The range-wide population trend for ferruginous hawk is probably stable. Local declines have been noted (e.g., Woffinden and Murphy 1989), but a widespread decline was not evident as of the early-1990s (USFWS 1992, Olendorff 1993). North American Breeding Bird Survey (BBS) data for the U.S. and Canada indicate an average annual 0.5 percent increase for 1966-1989 (Droege and Sauer 1990). Wintering data from Christmas Bird Counts also indicate an increase in numbers from 1952-1984 (USFWS 1992).

The most recent population estimate is 5,842-11,330 birds (Olendorff 1993). However, Schmutz et al. (1992) estimated 14,000 birds for the Great Plains alone. Estimated population in Canada in the early 1990s was 2,000-4,000 breeding pairs (Schmutz 1994, COSEWIC report, cited by Jensen 1995). Between year movements of population centers and individuals makes estimation of actual abundance difficult.

Threats to ferruginous hawk include: habitat loss and fragmentation, competition from other raptors, shooting, loss of prey due to poisoning, and disturbance to nesting birds.

Organization Rankings

The ferruginous hawk has a global conservation rank of G4, and a similar rating (N4), in the United States. The Partners in Flight Watch List identifies ferruginous hawk as a "High Priority" species for the Wyoming, North Dakota, South Dakota, and Nebraska. This species was formally considered a sensitive species in Region 1 of the Forest Service and is still classified as a sensitive species in Region 2. The Committee on Environmental Cooperation, established under the North American Free Trade Act, has identified the ferruginous hawk as a priority grassland species for conservation action.

Habitat

General

Ferruginous hawks prefer open grasslands and shrub steppe communities (Gillihan and Hutchings 2000). They use native and tame grasslands, pastures, hayland, cropland, and shrub steppe. Ferruginous hawks usually occupy rolling or rugged terrain (Black 1992). High elevations, forest interiors, narrow canyons, and cliff areas are avoided (Janes 1985, Black 1992).

Nesting

Landscapes with moderate coverage (<50%) of cropland and hayland are used for nesting and foraging (NatureServe 2000). Nest site selection depends upon available substrates and surrounding land use (Dechant et al. 1999). Lone or peripheral trees are preferred over densely wooded areas when trees are selected for nesting (Dechant et al. 1999).

Foraging

Ferruginous hawks hunt in open habitats, including pastures, haylands, croplands and prairie dog colonies. Prey vulnerability is an important factor in habitat suitability, such that ferruginous hawks avoid dense vegetation that reduces their ability to see prey (Howard and Wolfe 1976, Wakeley 1978, Schmutz 1987). In the planning area, prairie dogs provide an important and stable food source through the year. In North Dakota, hayfields and native pastures were the habitats most often used by both fledglings and adults, whereas cultivated fields rarely were used (Konrad and Gilmer 1986). Fledglings in South Dakota hunted in an area where native hay recently had been cut. When prey densities were low in big sagebrush / grassland habitat, agricultural fields served as important foraging areas (Leary et al. 1998).

Conservation Planning

There is no conservation plan for ferruginous hawks.

Direct and Indirect Effects on NFS Lands

Ferruginous hawks could be affected by proposed management activities in one of three ways:

- Changes in habitat resulting from vegetative management (particularly grazing) and increases in prairie dog towns,
- Changes in nest site availability due to changes in tree recruitment, and
- Disturbance to nesting birds resulting from land management activities such as energy development.

Changes in Prey Availability

Livestock grazing benefits ferruginous hawks by reducing vegetative cover and making prey more visible (Wakeley 1978, Konrad and Gilmer 1986). Kantrud and Kologiski (1982) found the highest densities of ferruginous hawks in heavily grazed areas. These areas provided a combination of grazing and soil type (typic borolls) that resulted in abundant prey populations (Kantrud and Kologiski 1982). In Saskatchewan, preferred grassland habitat exists in large blocks of government pastures located along the Montana and Alberta borders (Houston and Bechard 1984). These habitat blocks are the only remaining areas with stable ferruginous hawk populations in Saskatchewan (Houston and Bechard 1984). Bock et al. (1993) suggested that

ferruginous hawks would respond negatively to grazing in shrub steppe habitats, based on the ground cover requirements of their prey. Because prairie dogs are an important prey item for some ferruginous hawks, proposed increases in black-tailed prairie dog colonies on many of the planning units would be beneficial. Prescribed burning would be expected to benefit ferruginous prey diversity.

Nest Site Availability

Livestock grazing can decrease ferruginous hawk nesting habitat. In South Dakota, ferruginous hawks preferentially placed ground nests in lightly grazed pasture or idle areas (Blair and Schitoskey 1982). Livestock can weaken nest trees by excessive rubbing or trampling (Houston 1982, Olendorff 1993).

Disturbance

The ferruginous hawk is easily disturbed during the breeding season (Gilmer and Stewart 1983, Schmutz 1984, White and Thurow 1985, Bechard et al. 1990). Abandonment of nests occurs particularly in the early stages of nesting (Davy 1930, Weston 1968, Fitzner et al. 1977, Gilmer and Stewart 1983, White and Thurow 1985). In eastern Colorado, nests in remote locations had greater productivity compared to more accessible nests (Olendorff 1973 in DeChant et al. 1999). In South Dakota, the probability of fledging young was 11.4 percent greater in more remote nests than in nests within 1.5 miles (2.5 kilometers) of occupied buildings (Blair and Schitoskey 1982). In North Dakota, ferruginous hawks avoided nesting within 1 mile (0.7 kilometer) of occupied buildings (Gaines 1985 in DeChant et al. 1999). In other instances, the species is more tolerant of human disturbance. Nesting has occurred near active railroads and gravel roads (Rolfe 1896, Gilmer and Stewart 1983, MacLaren et al. 1988), and near petroleum development with no adverse effect (Zeenak and Rotella 1997 and Van Horn 1993 cited in Dechant et al. 1999). Sensitivity to disturbance may be heightened in years of low prey abundance (White and Thurow 1985).

Cumulative Effects

Continued livestock grazing, energy development, and conversion of rangeland to croplands can be expected to occur on private lands throughout the planning area (Ostlie et al. 1997, USDA Forest Service 2000, Commission on Environmental Cooperation 2000).

The Conservation Reserve Program (CRP) promotes dense grassland cover and reduces the low vegetative structure habitats preferred by ferruginous hawks.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. These agreements are long term and collectively cover virtually all land suitable for grazing which are also the lands suitable for the ferruginous hawk. Grazing can be beneficial to ferruginous hawks as can prescribed fire. The extensive areas under grazing permits reduces the opportunities for prescribe burning large areas because of the lack of alternative forage.

Conservation Measures and Mitigation

Keys to management are providing suitable nest sites, protecting active nest areas from disturbance, and improving habitat for prey. The U.S. Geological Survey has developed several management recommendations for the ferruginous hawk (Dechant et al. 1999). Those most relevant to the planning units are:

- Maintain ownership of public lands that have substantial numbers of ferruginous hawks (Olendorff 1993).
- Do not disturb nest sites from 15 March to 15 July (Howard and Wolfe 1976, Bechard and Schmutz 1995). Close public areas near nest sites to recreation during the breeding season and close public land to firearms where dense populations of ferruginous hawks are particularly susceptible to shooting (Olendorff 1993). Establish buffer zones around nest sites (Leslie 1992 in DeChant et al. 1999) and delay energy development until 45 days after fledging (Konrad and Gilmer 1986). Generally, avoid treatments between 1 March and 1 August each year, especially during the incubation period when ferruginous hawks are more prone to abandon nests if disturbed. Mitigate development impacts from mining, pipeline construction, and urbanization (Bechard and Schmutz 1995).
- Enhance, protect, and create nest substrates through fencing of nest trees, supporting heavy tree nests that are at risk of toppling, and building artificial nesting structures where nest sites are otherwise lacking (Smith and Murphy 1978, Houston 1985, Bechard and Schmutz 1995, Leary et al. 1998). Other successful nest structure management techniques are to remove some of the previous year's nesting material to reduce the chance of toppling, realign the nest over a vertical axis, widen the base of the nest, reinforce the base of the nest using wire netting or other materials, move the nest to a safer location, or provide protection from predators by nailing tin sheathing around the tree base (Craig and Anderson 1979).
- Encourage rest-rotation or deferred-rotation grazing systems (Olendorff 1993). Delay grazing to allow for the completion of incubation (Atkinson 1992).

Gillihan and Hutchings (2000) also provide recommendations for managing this species and its habitat.

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

All Planning Units Except SNG

- Prohibit above ground oil and gas facilities within 0.5 mile of an active raptor nest (Standard).
- Restrict activities (seismic, construction, etc.) within 0.5 mile of active raptor nests from 3/1 to 7/31 (Guideline).
- Objectives prescribe increasing population trends for black-tailed prairie dogs.
- Several standards and guidelines restrict the use of rodenticides to reduce prairie dog populations.

- Restrict prairie dog shooting where significant risks have been identified for other wildlife species or where shooting is preventing or slowing a desired prairie dog population expansions (Guideline).
- Prohibit changes in existing water flow regimes due to oil and gas activities that would flood prairie dog burrows (Standard).
- Use livestock and prescribed fire to enhance habitat suitability for prairie dogs where prairie dog expansion is desired (Standard).

All Planning Units Except SNG, cont.

- Manage for low vegetative structure in areas where prairie dog expansion is desired (Standard).
- An objective and numerous standards and guidelines provide direction to manage at least 80% of the riparian and wooded draw habitats for regeneration.

Geographic Area Direction (Chapter 2)

All Planning Units Except SNG

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).
- Establish new prairie dog complexes (see prairie dog evaluation in Section 3). Objective.

Management Area Direction (Chapter 3)

LMNG, BGNG, TBNG (MA 3.63)

- Maintaining or establishing large prairie dog complexes is emphasized in several areas allocated to MA 3.63.

Monitoring Direction (Chapter 4)

BGNG, TBNG

- Monitor populations and habitat.

LMNG, BGNG, TBNG

- Monitor the effectiveness of oil and gas stipulations in protecting this species and its habitat.

Appendices

LMNG, BGNG, TBNG

- Oil and gas stipulations in Appendix D are provided to reduce adverse effects to the species.

Biological Determinations, Risk Assessments, and Rationale

FPNG, BGNG, ONG, TBNG, NNF (PRRD), NNF (BRD), SRMNF

Management activities would have mixed impacts on ferruginous hawk and their habitat. Potential adverse effects include avoidance of grazed areas by nesting birds, disturbance of nesting birds by management activities such as energy development, and loss of nest trees due to livestock grazing or rubbing. Mitigation for these impacts include increasing the use of rest, using spatial and temporal buffers to reduce disturbance, and increasing direction for protection and restoration of woody habitats. Prey species availability would improve under Alternative 3, due both to the increased diversity of vegetative composition and structure, and the expected increase in black-tailed prairie dogs. Overall, habitat conditions are expected to improve over current conditions, though some adverse impacts would still occur. The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Outcome I is selected as the risk assessment for the species on these areas. Ferruginous hawks have great dispersal abilities and use a variety of habitats. Also, there is no need for transplants or reintroductions of this species.

LMNG, GR/CRNG

Biological determinations are not made for this species on these areas since it is not listed as sensitive by Region 1 of the Forest Service. The conservation measures listed above are expected to enhance its habitat and/or protect the species and its habitat from possible adverse effects of Forest Service authorized activities and allocations.

Merlin (*Falco columbarius*)

Species Description

The merlin is a small (about 12 inches long) falcon found throughout much of the Northern hemisphere. In size, the merlin resembles the slightly smaller and more familiar American kestrel. In both plumage and behavior however, the merlin is distinct. Merlin are less boldy marked than kestrels, with the main field marks being a light supercilium, blue-gray (male) or brownish (female) dorsum, and a streaked ventrum. The relatively long, straight tail is slaty gray with 2-5 narrow light bands. In flight, this raptor is sometimes mistaken for a pigeon, giving rise to its former name of “pigeon hawk.”

Across its broad range, the merlin comprises 10 subspecies. Three of these, the black, taiga, and prairie merlins, are found in North America. The black merlin (*F. c. suckleyi*) breeds in the Pacific Northwest, and might occur in the planning area as a vagrant migrant. The taiga subspecies (*F. c. columbarius*) nests across most of Canada and portions of the adjacent United States, and is a regular migrant through the Great Plains, as well as an occasional winter visitor. The prairie, or Richardson's, merlin (*F. c. richardsonii*) breeds and regularly winters in south central Canada and the northern prairie states. It is the only subspecies which nests in the planning area and will be the focus of the following discussion.

The merlin's breeding cycle starts with pair formation in early spring. In the planning area, most egg-laying occurs in April and May, with an average of about 4 eggs (Stewart 1975, Becker and Sieg 1985). The species typically nests in an old corvid or hawk nest in a conifer or deciduous trees. Incubation and nestling stages last about 30 days each. Fledglings are dependent upon the adults and remain in the nest area for up to a month (Sodhi et al. 1993).

Merlin prey on birds, mammals, insects, and reptiles, but the bulk of their diet is comprised of small birds < 1.75 ounces (50 grams) in weight (Sodhi et al. 1993).

Distribution and Status

The prairie merlin breeds from southern Alberta, southern Saskatchewan, and southwestern Manitoba south to northern Montana and western North and South Dakota. It winters in or near its breeding range, as well as moving south into the southern Great Plains, southwestern United States, California, and northern Mexico.

Table H-6 summarizes species occurrence and status in the planning area. The merlin is known to or may possibly occur on all units. Nesting is known to occur on the Little Missouri National Grassland (Stewart 1975), and Thunder Basin National Grassland (Tim Byer pers. comm.) and fledglings have been observed on the Nebraska National Forest (Ross Silcock pers. comm.).

Organization Rankings

The merlin has been assigned G5 by the International Network of Natural Heritage programs and Conservation Data Centeres. A G5 rank is for taxa that are demonstrably widespread, abundant, and secure globally. The merlin's rankings in the United States are N4B and N4N, meaning that both the breeding and non-breeding populations of merlin are "apparently secure, uncommon but not rare, and usually widespread; possible cause for long-term concern". The species is classified as sensitive by Region 2 of the Forest Service.

Habitat

Merlin use a variety of habitats. Nesting occurs in both rural and urban areas in the planning area (R. Martin pers. comm.). Based on research in nearby southeast Montana (Becker and Sieg 1987), preferred nesting habitats in the planning area could be characterized as the ecotone between wooded and grassland or shrubland sites. Suitable woodlands include ponderosa pine stands, woody draws, and riparian areas.

On the planning units, suitable nesting habitat occurs on the Little Missouri, Thunder Basin, and Nebraska National Forest (Pine Ridge). There are approximately 123,000, 24,000, and 29,000 acres of deciduous and coniferous forests on the Little Missouri National Grassland, Nebraska National Forest (Pine Ridge Ranger District) and Thunder Basin National Grassland, respectively. Only a small portion of these forested acres may be suitable habitat and used by nesting merlin. Adjoining shrubland and grassland habitats are used for foraging. Because migrant and wintering merlin make use of an even greater variety of habitats, the majority of the lands considered by this evaluation are likely suitable habitat for merlin.

Conservation Planning

Statewide or regional habitat conservation strategies have not been prepared for this species.

Direct and Indirect Effects on NFS Lands

Management has the potential to impact merlin by changing prey availability, or changing nest site availability or quality (Becker and Sieg 1987, Becker 1984).

Small birds comprise the bulk of the merlin's diet. Management that leads to a simplification of habitat diversity would likely decrease merlin prey availability. Of the types of management proposed in this document, livestock grazing has the greatest potential to have this type of impact. Grasshopper spraying might reduce the availability of this prey for merlin, although this is not expected to be a very large impact in the planning area. Conversely, management that resulted in increased habitat diversity would benefit foraging merlin.

Merlin nest sites are most likely to be affected in two ways: 1) by the loss of suitable nest trees due to logging and the prevention of tree recruitment because of livestock grazing, and 2) from disturbance associated with land management activities such as oil and gas exploration (Richardson and Miller 1997, Romin and Muck 1999, Joslin and Youmans 1999). Efforts to improve tree recruitment in woody draws and riparian areas, and the maintenance of minimum mature tree stocking levels in ponderosa pine stands would benefit merlin nest site availability. Use of spatial and temporal buffers would reduce the potential impact of disturbance to nesting birds.

Cumulative Effects

All of the activities listed above under direct and indirect effects are likely occurring on private lands in the planning area, without the mitigation measures of spatial and temporal buffers and objectives, standards, and guidelines to specifically increase habitat diversity (USDA Forest Service 2000).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development and additional roads, traffic and pipelines.

Determining ponderosa pine forests to be within the suitable timber base can result in pre-commercial thinning and commercial timber sales.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

All Planning Units

- Prohibit above-ground oil and gas facilities within 0.5 mile of active raptor nests (Standard).
- Restrict activities (seismic, construction, timber harvest, thinning, etc.) within 0.5 miles of active raptor nests from 4/1 to 8/15. (Standard and Guideline)
- Design activities to protect and manage the riparian ecosystem (Standard).

- Locate activities and facilities away from riparian areas unless alternatives have been assessed and determined to be more environmentally damaging (Guideline).
- Design and construct all stream crossing and other in-stream structures to provide for sufficient passage of flow and sediment, withstand expected flood flows, and allow free movement of aquatic life (Standard).
- Manage livestock grazing to maintain or improve riparian areas (Guideline).
- An objective and numerous standards and guidelines provide direction to manage at least 80% of the riparian and wooded draw habitats for regeneration.
- Use prescribed burning to improve or maintain habitats of desired plant and animal species (Guideline).

FPNG, BGNG, ONG, NNF (PRRD), NNF (BRD), SRMNG, TBNG

- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

All Planning Units

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).

NNF (PRRD)

- Initiate forest management practices that emphasize structural stages 4a (mature open) and 5 (old growth / late successional). Long-term objectives are 40% of the forest cover in structural stage 4 and 20% in structural stage 5.
- Objectives also exist for using prescribed burning and other methods to help achieve desired vegetation conditions including ponderosa pine savannah.

TBNG

- During vegetation management projects, use methods that emphasize development of structural stages 4 and 5. The longterm objective is to have approximately 40% of the forest cover in structural stage 4 and 20% in structural stage 5 (Objective).
- Fire will be reintroduced as determined by project specific resource needs (Objective).
- Management activities should replicate natural biological processes and vegetative patterns and patch sizes (Guideline).
- During vegetation management projects, maintain an average of 4 snags per forested acre (Standard).
- Retain all soft snags unless they are a safety hazard (Guideline).
- When necessary to meet the minimum snag standard, create snags from live tree replacement (Guideline).

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

FPNG, BGNG, ONG, NNF (PRRD), NNF (BRD), SRMNG, TBNG

- Monitor populations and habitat.

All Planning Units

- Monitor the effectiveness of oil and gas stipulations in protecting this species and its habitat.

Appendices

All Planning Units

- Oil and gas stipulations in Appendix D are provided to reduce adverse effects to the species.

Biological Determinations, Risk Assessments, and Rationale

FPNG, BGNG, ONG, NNF (PRRD), NNF (BRD), SRMNG, TBNG

Management activities have the potential to impact nesting, migrating, or wintering merlin on all units. Potential impacts would most likely result from a change in prey availability or nesting habitat suitability. These potential impacts will be mitigated with the use of spatial and temporal buffers for merlin nests and nesting habitat. Foraging and nesting habitat will be enhanced through vegetation management including livestock grazing management, prescribed burning and other methods. The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Outcome I is selected as the risk assessment for this species on these areas. Ferruginous hawks have great dispersal abilities and use a variety of habitats. Also, there is no need for transplants or reintroductions of this species.

LMNG, GR/CRNG, SNG

Biological determinations are not made for this species on these areas since it is not listed as sensitive by Region 1 of the Forest Service. The conservation measures listed above are expected to enhance its habitat and/or protect the species and its habitat from possible adverse effects of Forest Service authorized activities and allocations.

Pygmy Nuthatch *(Sitta pygmaea)*

Species Description

The pygmy nuthatch is the smallest of the three nuthatch species found in the planning area. It is about 4 inches long, with a gray-brown crown, blue-gray back, cream-colored underparts, and a white face. This species excavates its nest cavity in dead wood, often more than 20 feet above ground. Up to 10 white eggs are laid, hatching in about 2 weeks. After a nestling period of 3 weeks, the young fledge and are then attended by the adults for up to an additional month (Baicich and Harrison 1997). Interestingly, non-parent adult nuthatches (called “helpers”) may assist with nest excavation and feeding the young. After the breeding season, pygmy nuthatches form small flocks, often associating with chickadees, brown creepers, kinglets, or

woodpeckers. The pygmy nuthatch feeds on insects and spiders gleaned from needles and bark, as well as pine seeds.

Distribution and Status

The pygmy nuthatch is resident from southern British Columbia to western Montana, and south through the Rocky Mountain states into Mexico. In the Great Plains, this species is restricted to the "sky island" outcroppings of ponderosa pine forest.

Pygmy nuthatch are considered uncommon in the Black Hills of South Dakota and Wyoming (South Dakota Ornithologists' Union 1991), rare in the rest of Wyoming (Dorn and Dorn 1990), and uncommon in the Pine Ridge area of northwest Nebraska. The pygmy nuthatch is a year-round resident, though some flocks wander in winter when food supplies are particularly low.

Table H-6 summarizes species occurrence and status in the planning area. It is known to occur on the Nebraska National Forest (Pine Ridge) and may occur on the Thunder Basin National Grassland. Breeding Bird Survey (BBS) data do not show any statistically significant changes in abundance over the last several decades.

Organization Rankings

The pygmy nuthatch is classified as sensitive in Region 2 of the Forest Service. This species has been assigned a rank of G5 by the International Network of Natural Heritage programs and Conservation Data Centeres. A G5 rank is for taxa that are demonstrably widespread, abundant, and secure globally. The ranking in the United States is similar (N5).

Habitat

Pine forests, particularly open (<70% canopy closure), park-like forests, are favored by the pygmy nuthatch. In the eastern portion of its range, it is closely associated with ponderosa pine. Because pygmy nuthatch are weak excavators, they require forests with some trees that offer relatively soft, decayed wood (DeGraaf et al. 1991). Cavities in larger (>18 inches dbh) snags are preferred for nesting, as well as roosting (Cunningham 1980). A more detailed description of the habitat of this species is presented in the biological assessment and evaluation for the Black Hills National Forest Land and Resource Management Plan (USDA Forest Service 1996).

There are approximately 22,000 and 10,000 acres of ponderosa pine forests on the Nebraska National Forest (Pine Ridge Ranger District) and Thunder Basin National Grassland, respectively. Because of a lack of current forest inventories, the amount of this area that is suitable for pygmy nuthatches (structural stages 4a, 4b and 5) is unknown, but it's reasonably safe to assume that most of this acreage is currently unsuitable or marginal for pygmy nuthatches.

Conservation Planning

A statewide or regional habitat conservation strategy has not been prepared for this species.

Direct and Indirect Effects on NFS Lands

The most common threats to pygmy nuthatch habitat are certain types of timber harvest, and fire suppression. Limited timber harvest is anticipated in this document**.** In ponderosa pine habitat throughout the planning area however, fire suppression is a common threat to this species. Long-term fire suppression has resulted in much higher tree stocking density in ponderosa pine stands than what occurred historically. These dense stands are unsuitable for pygmy nuthatch. Fire suppression will continue.

Cumulative Effects

Timber harvest is occurring on large acreages of private land within the Nebraska pine ridge area. It's estimated that timber sales have occurred on approximately 42,000 acres of forested private lands since the early 1990s (John Overstreet, personal comm.). This acreage includes inaccessible pine stands. The primary silvicultural harvest method used on private lands is to selectively cut all merchantable mature trees in a ponderosa pine stand. The number of mature but non-merchantable mature trees left after harvest is highly variable between stands. Therefore, it is difficult to characterize the over all effects of this management on pygmy nuthatches and their habitat. Fire suppression will also continue on private lands, and this will perpetuate the continuing development of thick ponderosa pine stands in inaccessible areas. This will reduce the suitability of these areas for this species.

Interrelated and Interdependent Actions

Determining ponderosa pine forests to be within the suitable timber base can result in pre-commercial thinning and commercial timber sales.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

NNF (PRRD), TBNG

- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

NNF (PRRD)

- Use silvicultural methods to emphasize development of structural stages 4a and 5 (Objective).
- Manage for 40% and 20%of the forest cover to be in structural stages 4 and 5 over the long-term (Objective).
- Use prescribed burning to achieve desired vegetation conditions including ponderosa pine savannah (Objective)
- Design vegetative treatments to maintain an average of 4 snags per forested acre (Standard).

- Retain all soft snags unless they are a safety hazard (Guideline).
- When necessary to meet the minimum snag standard, create snags from live tree replacement (Guideline).

TBNG

- During vegetation management projects, use methods that emphasize development of structural stages 4 and 5. The longterm objective is to have approximately 40% of the forest cover in structural stage 4 and 20% in structural stage 5 (Objective).
- Fire will be reintroduced as determined by project specific resource needs (Objective).
- Management activities should replicate natural biological processes and vegetative patterns and patch sizes (Guideline).
- During vegetation management projects, maintain an average of 4 snags per forested acre (Standard).
- Retain all soft snags unless they are a safety hazard (Guideline).
- When necessary to meet the minimum snag standard, create snags from live tree replacement (Guideline).

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

NNF (PRRD), TBNG

- Monitor populations and habitat.

Appendices

NNF (PRRD), TBNG

- Appendix H provides a description of quality habitat for this species. This appendix is referenced by a standard under unit-wide direction (Chapter 1) to provide quality habitat for management indicator species.

Biological Determinations, Risk Assessments, and Rationale

NNF (PPRD)

The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide". Continued fire suppression in these areas will further exacerbate the loss of pygmy nuthatch habitat quantity and quality. Some of this loss however, will be offset by forest management activities to emphasize structural stages 4 and 5.

Little is currently known about the populations of this species in this area so a risk assessment was not attempted. However, the species has been selected as a management indicator species and monitoring will be a high priority to determine distribution and to obtain baseline population information.

TBNG

Determination is "no impact." The species presence on these areas has not been confirmed and documented. However, management direction is provided for this species and potential habitat on these areas.

Western Burrowing Owl (*Athene cunicularia*)

Species Description

The burrowing owl is a small round-headed owl with no ear tufts, a poorly developed facial disc, long, slim, legs, and a short tail. Adults are greyish brown overall, and are thickly spotted with white and buff. Their breast and abdomen are whitish and barred with brown.

Two subspecies of burrowing owl breed in North America: the western burrowing owl (*A. c. hypugaea*) and the Florida burrowing owl (*A. c. floridana*). The western burrowing owl is the subspecies that occurs in the planning area, and is the focus of the following discussion.

Burrowing owls nest in underground burrows. Clutch sizes range from 3 to 12 eggs. Incubation lasts 27-30 days, with the young hatching asynchronously. Beginning at about 14 days of age, the young spend increasing time at the mouth of the burrow, retreating into it when alarmed. Young fledge in about 40-45 days.

Burrowing owl prey consists primarily of small mammals and invertebrates, but they also consume small birds, reptiles, and amphibians. They tend to be opportunistic feeders. Owls concentrate nocturnal foraging effort in areas with high small mammal abundance (e.g. deer mice and meadows voles), which account for the bulk of their caloric intake (Wellicome 1997b). Diurnal foraging is chiefly for invertebrates and is concentrated around the vicinity of the nest burrow (Haug and Oliphant 1990, Haug et al. 1993).

Distribution and Status

Distribution

Western burrowing owls breed from southern Alberta to southwestern Saskatchewan, south through east-central Washington, central Oregon, and southern California, and east to eastern North Dakota, westcentral Kansas, and Texas. Populations in the northern part of this range are migratory (National Geographic Society 1987), apparently wintering in dispersed locations including Arkansas, Missouri, Oklahoma, Texas, and Mexico (Haug et al. 1993).

Burrowing owls occupy their breeding grounds within the Great Plains from about early April until September (Grant 1965, Ratcliff 1986, Haug and Oliphant 1990).

Table H-6 summarizes species occurrence and status in the planning area. They are known to occur on all of the planning units except the Sheyenne National Grassland where their presence or use of the area has not been confirmed. Burrowing owls occur at 90% of active prairie dog colonies on Great Plains National Grasslands, although their occupancy is considerably lower at Little Missouri and Thunder Basin National Grasslands (Sidle et al. *in press).* Recent research on the large prairie dog colony complex on the Buffalo Gap National Grassland has identified one of the highest nesting densities of burrowing owls in the Great Plains.

Status

Burrowing owls have declined overall in the Great Plains, where the species is closely associated with prairie dog colonies. Prairie dogs have been greatly reduced by cultivation, poisoning, and plague. In North Dakota, the owl is nearly extirpated east of the Missouri River; west of the Missouri, occupancy dropped 30% to 50% on prairie dog towns between 1991 and 1996 (Murphy et al. 1998). Populations in western Nebraska declined 58% (91 to 38 nesting pairs), 1990-1996 (Desmond and Savidge 1998). In Wyoming, only 11% of 86 historical sites were occupied in 1998; 12% of the sites had been lost to land conversion (Korfanta et al. 1998). No complete survey has been completed in Canada, but various studies show widespread range contraction and declining density (Hjertaas et al. 1995). If present trends continue, extirpation from Manitoba will occur within a few years and extirpation from all of Canada may occur within a few decades (Wellicome and Haug 1995).

North American Breeding Bird Survey (BBS) and Christmas Bird Counts (CBC) show stable trends survey-wide from 1966-1996 and 1959-1988, respectively (Sauer et al. 1996, 1997). BBS data, 1966 to 1996, show a significant decline in the Central BBS Region, a stable trend in the Western BBS Region, and non-significant declines in Colorado, New Mexico, South Dakota, and Texas. Mapped BBS counts show higher relative abundances in the national grasslands of the central Great Plains (Sauer et al. 1997). James and Ethier's (1989) analysis of CBC data also shows a stable North American population, 1954 to 1986, but with an overall decline from the mid-1970s to the mid-1980s, and a significant decline in California. The BBS and CBC, however, may not track trends with much sensitivity due to low sample sizes. These surveys do not adequately sample species occurring in small, disjunct groups.

Primary threats across the North American range, including Mexico, are habitat loss and fragmentation due to intensive agricultural and urban land conversion, and habitat degradation due to control and extermination of colonial burrowing mammals (Haug et al. 1993, Sheffield 1997). The dramatic 98% reduction of prairie dogs has been linked to reduction of owl populations (Evans 1982, Sheffield 1997). Fragmentation and isolation are threats to small and localized populations that may be more prone to extinction. Johnson (1997) observed a wild population of < 50 owls go extinct in half the time predicted by a deterministic model. Scarcity of nesting habitat may reduce opportunities for unpaired owls to find mates (Sheffield 1997).

Organization Rankings

Burrowing owls are classified as sensitive in Regions 1 and 2 of the Forest Service. The global conservation rank for this species is G4. Burrowing owls are considered a “High Priority” Watch List species in Wyoming and Nebraska. The specie’s status in Canada was changed from threatened to endangered in 1995 (COSEWIC 1998). The Committee on Environmental Cooperation, established under the North American Free Trade Act, has identified the burrowing owl as a priority grassland species for conservation action.

Habitat

General

Burrowing owls use well-drained, level to gently sloping grassland habitats characterized by sparse vegetation and bare ground, such as moderately or heavily grazed pasture. Burrowing owls breed in native prairie, as well as in tame pasture and hayland.

Nesting

Burrowing owls on the Great Plains do not dig their own burrows, and usually rely on burrowing mammals to excavate nest sites. They often use black-tailed prairie dog or Richardson's ground squirrel colonies. Burrow availability may be limiting in areas lacking colonial burrowing rodents (Desmond and Savidge 1996); in these areas, burrowing owls frequently use American badger excavations.

Prairie dog colonies are the preferred habitat of burrowing owls in the majority of the planning area, and all prairie dog colonies are considered potential burrowing owl habitat. Prairie dog colonies provide burrows and the early successional grasslands with low structure that burrowing owls prefer. The size of prairie dog colonies in western Nebraska was positively correlated with fledging success rates (Desmond 1991). Reproductive success improved with increasing colony size on the Buffalo Gap National Grassland (Griebel 2000).

Foraging

Burrowing owls forage in a variety of habitats, including cropland, pasture, prairie dog colonies, fallow fields, and sparsely vegetated areas (Butts and Lewis 1982, Thompson and Anderson 1988, Desmond 1991, Haug et al. 1993, Wellicome 1994). In southeastern Saskatchewan, prey abundance and species richness were evaluated in native grassland, road rights-of-way, cropland, summer fallow, pasture, and hayland (Wellicome 1994). Habitats that were associated with periodic plowing (cropland and fallow fields) have a lower prey-species richness than does native grasslands, road rights-of-ways, pastures, or haylands. Habitats with tall (12-24 inches, 30-60 cm) vegetative cover (road rights-of-way, native grassland, and mature cropland) had more abundant prey than hayland, pasture, or fallow fields (Wellicome 1994, Wellicome and Haug 1995). However, vegetation >3.3 ft (1 m) tall may be too tall for burrowing owls to locate or catch prey.

In western Nebraska, burrowing owls nesting in black-tailed prairie dog colonies took foraging trips of longer duration than owls nesting in American badger excavations within pastures, suggesting that prey was more limiting to owls nesting in prairie dog colonies than to owls nesting in American badger excavations (Desmond 1991). Increased competition for prey may explain the difference in duration of foraging trips. Burrowing owls nested at higher densities in the prairie dog colonies..

Conservation Planning

Canada’s recent national recovery plan for the species (Canadian Burrowing Owl Recovery Team 1995) focuses on the conservation of Richardson’s ground squirrel whose burrows provide habitat for burrowing owls, and restricting grasshopper spraying.

Direct and Indirect Effects on NFS Lands

Prairie Dog Poisoning

As previously mentioned, active prairie dog colonies are prime burrowing owl habitat. Elimination of burrowing rodents with rodenticides has been identified as the primary factor in the recent and historical decline of burrowing owl populations (Dechant et al. 1999, NatureServe 2000). In particular, preservation of black-tailed prairie dogs and Richardson's ground squirrels may be essential to the conservation of burrowing owls. Declines of burrowing owl populations north and east of the Missouri River in North Dakota may be

related to declines in Richardson's ground squirrel populations (Murphy et al. *in press*). South and west of the Missouri River, burrowing owl population declines may be related to reductions in populations of black-tailed prairie dogs

Grazing

Burrowing owls prefer grasslands grazed heavily by cattle or prairie dogs (James and Seabloom 1968, Butts 1973, MacCracken et al. 1985*a*, Bock et al. 1993). Cessation of grazing negatively impacts burrowing owl populations. In southcentral Saskatchewan, heavily grazed, poor soils were used frequently by burrowing owls, and moderate to heavy grazing on good soils reduced lush vegetative growth and provided suitable habitat. Owls in Saskatchewan and Alberta nested in pastures with shorter vegetation than occurred in randomly chosen pastures (Clayton 1997 in DeChant et al. 1999). Burrowing owls in North Dakota nested in moderately or heavily grazed mixed-grass pastures, but not in hayed or lightly grazed mixed-grass (Kantrud 1981). Declines in owl populations north and east of the Missouri River in North Dakota may be due to a reduction over the past 20 years in the sheep grazing that occurs in the region (Murphy et al. *in press*). In the Platte River Valley of Nebraska, preferred nest sites were in heavily grazed or mowed native grasslands (Faanes and Lingle 1995). Optimal breeding habitat in portions of Colorado, Montana, Nebraska, North Dakota, South Dakota, and Wyoming occurred in heavily grazed areas with aridic ustoll soils and grazed areas with typic boroll soils (Kantrud and Kologiski 1982). Burrowing owl habitat quality is expected to increase as a result of proposed creation and maintenance of low seral and low structure vegetation.

Burning

Little information exists on the response of burrowing owls to burning. In northcentral Oregon, Burrowing owls were observed nesting in American badger excavations in previously unused areas that recently had been burned, suggesting that fire may create suitable habitat by reducing vegetation around potential nest sites (Green and Anthony 1989). Additionally, in northwestern North Dakota, post-settlement fire suppression may be responsible for the development of a taller, denser, and woodier plant community than previously existed (Murphy 1993). These vegetational shifts may have been responsible for the local extirpation of burrowing owls. Overall, burrowing owls would be expected to benefit from prescribed burning.

Mowing

In northcentral Colorado, mowing may be used to control growth of grasses and woody vegetation in areas where black-tailed prairie dogs have been eliminated; abandoned black-tailed prairie dog colonies that were not mowed were not used by owls (Plumpton 1992). Mowing also may enhance the attractiveness of nest sites for burrowing owls returning from the wintering grounds (Plumpton and Lutz 1993). Mowing throughout the breeding season apparently does not adversely affect nesting burrowing owls. However, burrows may require maintenance by prairie dogs in order to ensure their long-term suitability for owls; it may be necessary to release prairie dogs into inactive colonies (MacCracken et al. 1985*a*; Desmond and Savidge 1999).

Pesticides

Use of insecticides and rodenticides in burrowing owl habitat can be especially detrimental; pesticides not only reduce the owl's food supply and the number of burrowing mammals, but these chemicals also may be toxic to the owl (Ratcliff 1986, James and Fox 1987, James et al. 1990, Berkey et al. 1993, PMRA 1995, Wellicome 1997*b*). Burrowing owls have been noted to ingest poisoned rodents and to forage on the ground for insects in areas littered with poison grains (Butts 1973, James et al. 1990). In southern Saskatchewan, owls in pastures treated with strychnine-coated grain weighed less than owls in control pastures, suggesting a sublethal effect or a reduction in small-rodent prey (James et al. 1990). A breeding population in the Oklahoma Panhandle declined by 71% within 1 year after sodium fluoroacetate was applied to the prairie dog colony in which the owls were nesting (Butts 1973). By the end of the breeding season, no owls remained at the site. Owl burrows occasionally are fumigated and sealed in the course of rodent-control programs (Butts 1973).

Disturbance

Disturbances associated with recreation or other land management activities could result in impacts on burrowing owl reproduction (Plumpton and Lutz 1997).

Cumulative Effects

The cumulative effects area for the burrowing owl analysis was defined as the entire planning area. Continued use of insecticides and conversion of rangeland to croplands can be expected to occur on private lands (Finch 1991, Ostlie et al. 1997, USDA Forest Service 2000). Approximately 55% of all prairie dog colonies occur on private and state lands (Mulhern and Knowles 1995). It is likely that reductions in prairie dog populations on private lands will continue through poisoning, loss of habitat (cultivation), and shooting. It is also likely that prairie dog colonies on private land will remain small and thus lower quality nesting habitat than larger prairie dog towns and complexes. Urban development (Zarn 1974, Konrad and Gilmer 1984), conversion of pastures to cropland (Grant 1965, Konrad and Gilmer 1984, Ratcliff 1986), and cultivation of grasslands (Grant 1965, Faanes and Lingle 1995) limit burrowing owl populations through the destruction of nesting habitat. The extirpation of gray wolves and increased tree cover on the prairie have allowed populations of other mammalian and avian predators to increase, probably to the detriment of burrowing owl populations (Wellicome and Haug 1995). It's also possible that burrowing owls are experiencing increased competition on a shrinking habitat base (Commission on Environmental Cooperation 2000).

Interrelated and Interdependent Actions

Decisions to make NFS lands available for oil and gas leasing can result in an application for permit to drill (APD) and eventual on-site development.

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. Livestock grazing permittees or grazing associations commonly request prairie dog poisoning on NFS lands to reduce forage consumption and clipping by prairie dogs.

Conservation Measures and Mitigation

Although there is not yet a conservation strategy for the burrowing owl, there are several avenues open to improve conditions for the species. Keys to management include providing areas of short, sparse vegetation and maintaining populations of prey species and of burrowing mammals to ensure availability of burrows as nest sites. In particular, the conservation of black-tailed prairie dog and Richardson's ground squirrel colonies appears to be vital to the preservation of burrowing owls on the Great Plains. The U.S. Geological Survey has developed the following relevant management recommendations (Dechant et al. 1999):

- In the United States, government agencies should shift from subsidizing prairie dog reduction to leadership in finding workable alternatives that maintain viable prairie dog communities and ranching systems (Benedict et al. 1996; Desmond and Savidge 1999, *in prep*.). Recognize that the eradication of prairie dogs may be economically costly, agriculturally unnecessary, and ecologically detrimental (Benedict et al. 1996).
- Preserve traditional nesting sites (Butts 1973, Zarn 1974, Ratcliff 1986, Warnock 1997). Burrowing owls often reuse nesting sites occupied in previous years (Butts 1973; Rich 1984; Haug and Oliphant 1990; Plumpton 1992; Plumpton and Lutz 1993).
- Maintain large, contiguous areas of native grassland (Benedict et al. 1996; Warnock 1997; Warnock and James 1997) including areas of treeless plains (Clayton and Schmutz 1999).
- Create a patchwork of reserves with sustainable land uses in surrounding buffer areas (Clayton and Schmutz 1999). Because owls forage over tall grass and nest and roost in short grass, a mosaic of habitats may be important in conserving habitat.
- Allow heavy grazing on saline, gravelly, stony, or sandy areas, because these areas are used frequently by burrowing owls in Saskatchewan (Wedgwood 1976). Allow moderate to intense grazing on good soils that otherwise would support tall vegetation.
- If insect control is necessary, choose insecticides with the lowest toxicity to nontarget organisms (James and Fox 1987).
- Do not spray pesticides within 0.25-0.4 mile (400-600 m) of owl nest burrows during the breeding season (1990; James and Fox 1987).
- Regulate poisoning and shooting of prairie dogs, particularly on public lands (Benedict et al. 1996, Toombs 1997).
- If lethal control of burrowing mammals is necessary, restrict the timing of control activities to avoid the period when burrowing owls choose nest sites or are nesting (Butts 1973). Do not use traps, poisoned meat, or poisoned grain for rodent control when burrowing owls are present, but rather fumigate burrows unoccupied by owls (Butts 1973). However, be aware that it is difficult to determine which burrows are unoccupied once fledglings begin to use satellite burrows.
- Increase the area of prairie dog colonies, possibly by reintroducing prairie dogs where they have been eliminated, or by releasing additional prairie dogs into active colonies to promote colony expansion (Pezzolesi 1994; Toombs 1997). Colonies $\geq$86 acres (35 ha) in area appeared to provide adequate space for nesting burrowing owls in Nebraska (Desmond et al. 1995).

Conservation Measures and Mitigation, cont.

- Maintain abandoned prairie dog colonies at an early successional stage, with short vegetation (<3 inches). Mowing can accomplish this, and would be critical around mid-March to improve nest-site attractiveness during nest initiation (Plumpton 1992, Plumpton and Lutz 1993). Mowing in mid- to late summer appears not to be detrimental to nesting owls. However, mowing abandoned colonies may be effective only in the short term; burrows may require maintenance by prairie dogs to remain suitable for owls (MacCracken et al. 1985*a*, Desmond and Savidge 1999).
- Implement rotational grazing in heavily grazed areas to increase prey populations (Wellicome et al. 1997).

Gillihan and Hutchings (2000) also provide recommendations for managing this species and its habitat.

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

FPNG, BGNG, ONG, NNF (BRD), TBNG

- Do not spray grasshoppers within 1/4 mile of known burrowing owl nests (Standard).
- Manage for active prairie dog colonies that are larger than 80 acres (Guideline).
- Restrict prairie dog shooting where significant risks have been identified for other wildlife species or where shooting is preventing or slowing a desired prairie dog population expansions (Guideline).
- Prohibit changes in existing water flow regimes due to oil and gas activities that would flood prairie dog burrows (Standard).
- Prohibit above-ground oil and gas facilities within 0.25 mile of an active nest (Standard).
- Restrict activities (i.e. seismic, construction, etc.) within 0.25 mile of an active raptor nest from 4/15 to 8/31 (Guideline).
- Align new roads to avoid prairie dog colonies (Guideline).
- Limit the use of rodenticides for reducing prairie dog populations to public health and safety risks and damage to private and public infra-structure (Standard).
- Consult with U.S. Fish and Wildlife Service approved, state-wide prairie dog conservation strategies for guidance on poisoning prairie dogs in response to complaints about agricultural damage on adjoining private lands (Guideline).
- Prohibit use of rodenticides for reducing prairie dog populations outside the period October 1 to December 31 (Standard).
- Do not use burrow fumigants in prairie dog colonies (Standard).
- Prohibit control of native insects until an evaluation of impacts to other resources is made (Guideline).

- Reduce conflicts with adjacent landowners over prairie dog management through an active landownership adjustment program (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

LMNG, GR/CRNG, SNG

- Do not spray grasshoppers within 1/4 mile of known burrowing owl nests (Standard).
- Manage for active prairie dog colonies that are larger than 80 acres (Guideline).
- Restrict prairie dog shooting where significant risks have been identified for other wildlife species or where shooting is preventing or slowing a desired prairie dog population expansions (Guideline).
- Prohibit changes in existing water flow regimes due to oil and gas activities that would flood prairie dog burrows (Standard).
- Prohibit above-ground oil and gas facilities within 0.25 mile of an active nest (Standard).
- Restrict activities (i.e. seismic, construction, etc.) within 0.25 mile of an active raptor nest from 4/15 to 8/31 (Guideline).
- Align new roads to avoid prairie dog colonies (Guideline).
- Limit the use of rodenticides for reducing prairie dog populations to public health and safety risks, damage to private and public infra-structure (Standard).
- Consult with U.S. Fish and Wildlife Service approved, state-wide prairie dog conservation strategies for guidance on poisoning prairie dogs in response to complaints about agricultural damage on adjoining private lands (Standard).
- Prohibit use of rodenticides for reducing prairie dog populations outside the period October 1 to December 31 (Standard).
- Do not use burrow fumigants in prairie dog colonies (Standard).
- Prohibit control of native insects until an evaluation of impacts to other resources is made (Guideline).
- Reduce conflicts with adjacent landowners over prairie dog management through an active landownership adjustment program (Guideline).
- Use livestock and prescribed fire to enhance habitat suitability for prairie dogs where prairie dog expansion is desired (Standard).
- Manage for low vegetative structure in areas where prairie dog expansion is desired (Standard).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

All Planning Units

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).
- Establish new prairie dog colony complexes (see prairie dog evaluation in Section #) (Objective).

Management Area Direction (Chapter 3)

LMNG, BGNG, TBNG (MA 3.63)

- Large acreages are allocated at four locations as black-footed ferret reintroduction habitat (MA 3.63). Black-tailed prairie dog colony complexes are actively and intensively managed at these locations, and prairie dog population expansion at two locations will be accelerated through management. See the black-footed ferret assessment in Section 2 of this document for more detail.

Monitoring Direction (Chapter 4)

- Monitor populations and habitat.
- Monitor the effectiveness of oil and gas stipulations in protecting this species and its habitat.

Appendices

LMNG, BGNG, TBNG

- Oil and gas stipulations in Appendix D are provided to reduce adverse effects to the species.

Biological Determinations, Risk Assessments, and Rationale

All Planning Units Except SNG

The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." The rationale for this determination is that management direction provides for a significant increase in prairie dog populations on each planning unit and additional direction to reduce direct threats to burrowing owls. The scrutiny of proposed grasshopper spraying projects should also provide extra safeguards for the species. It is acknowledged that the prairie dog populations on the Nebraska National Forest (BRD) may not be viable because of marginal habitat (loose sandy soils and other unfavorable habitat characteristics). This puts burrowing owls at risk on this unit, but this appears not to be the result of Forest Service actions.

The selected risk assessment for this species on the Little Missouri, Buffalo Gap, and Thunder Basin National Grasslands is outcome II or III. Prairie dog populations are undoubtedly reduced from what occurred historically on these areas, but colonies are still widely distributed across these large national grasslands. Because of this, it is likely that any future plague epizootics would likely be localized, and unaffected habitat would remain elsewhere on the national grassland (USDA Forest Service 2000). Repopulation of any suitable but unoccupied

habitat would likely occur naturally through dispersal.

The selected risk assessment for this species on the Grand River, Fort Pierre, and Oglala National Grasslands is outcome III, in the absence of any future plague epizootics. Outcome V is the selected risk assessment if plague epizootics occur in the future on these relatively small national grasslands and limited prairie dog populations.

SNG

Determination is "no impact." The species presence on these areas has not been confirmed and documented.

Sprague's Pipit (Anthus spragueii)

Species Description

The Sprague's pipit is a pale, slender, sparrow-sized bird with white outer tail feathers, a thin bill, pale legs, and a heavily-streaked back.

Sprague's pipit nests are placed on the ground and concealed in grass clumps (Terres 1980). Some are partially or completely arched over with dead grasses anchored to the surrounding vegetation. Clutch size is usually four or five eggs. The breeding season begins in late April (Stewart 1975). In North Dakota, clutches have been found June 7 -30. Incubation lasts about 13 days, with the young leaving the nest about 10 days post-hatching (Baicich and Harrison 1997).

Sprague's pipits can be heard singing from late April to early June, and again from mid-July through early September (Stewart 1975). Based on this behavior, the species is suspected of being double-brooded, but this has not yet been confirmed.

The only known records of brood parasitism by brown-headed cowbirds have been reported from the Canadian provinces of Saskatchewan and Manitoba.

Distribution and Status

Distribution

Sprague's pipits breed from northcentral Alberta to central Manitoba, south to Montana and northcentral South Dakota, and east to northwestern Minnesota (National Geographic Society 1987). The species winters from the southern tier of the Great Plains states south through Mexico (DeGraaf et al. 1991). Sprague's pipits arrive on the breeding grounds in April and depart for the wintering grounds in September and October (Stewart 1975).

Table H-6 summarizes species occurrence and status in the planning area. The species is known to nest on the Grand River, Cedar River, and Little Missouri National Grasslands, and has been found as a migrant on the Thunder Basin (Tim Byer pers. comm.), and Buffalo Gap (Ron Martin pers. comm.) National Grasslands.

Status

Sprague's pipit is apparently globally secure, although populations are declining, especially on the eastern edge of its range (see Martin and Boczkiewicz 1993). In Minnesota, it formally occurred throughout northwest and west-central Minnesota, but by 1932, Roberts (1932) reported that the bird was common only in the Red River Valley. The only recent Minnesota records are from Clay County (Green and Janssen 1975). Breeding Bird Surveys show a significant (-4.5%/year, P=0.0) decline for Sprague's pipit rangewide, as well as significant declines in the planning area.

Organization Rankings

The Sprague's pipit is classified as a sensitive species in Region 1 of the Forest Service. It has been assigned a ranking of G4 by the International Network of Natural Heritage Programs and Conservation Data Centeres. A G4 rank is for taxa that are "apparently globally secure." Its United States ranking is similar (i.e. a "N4"). The species is threatened in Canada and considered Moderately High Priority on the 1998 Watch List (Carter et al. 1998), and a high priority species in Wyoming, North and South Dakota, and Nebraska.

Habitat

Sprague's pipits use grasslands of intermediate height and sparse to intermediate vegetation density (Madden 1996, Sutter 1996 in DeChant et al. 1999, Sutter and Brigham 1996). Although they will use tame pasture, they are significantly more abundant in native prairie (Wilson and Belcher 1989, Dale 1992, Hartley 1994, Anstey et al. 1995, Madden 1996, Prescott and Wagner 1996, Sutter 1996, Davis and Duncan 1999). The species has been found to be area-sensitive in Saskatchewan, with the minimum area requirement being 470 acres (SWCC 1997).

Important nesting habitat features include low visual obstruction, moderate litter cover, and little or no woody vegetation (Dale 1992, Anstey et al. 1995, Madden 1996, Sutter 1996, Davis and Duncan 1999). Within grazed mixed-grass areas in North Dakota, abundance of Sprague's pipits was positively associated with percent clubmoss cover and plant communities dominated by native grass (*Stipa, Bouteloua, Koeleria,* and *Schizachyrium*) (Schneider 1998). Abundance was negatively associated with percent grass cover, litter depth, density of low-growing shrubs, vegetation density, and with plant communities dominated by Kentucky bluegrass and native grass. In areas not occupied by Sprague's pipits, percent grass cover, litter depth, and vegetation density were greater than in areas where the species was present.

The acres of grassland habitat (<25% slope) on each of the planning units are as follows:

Planning Unit	Acres of Potential Grassland Habitat
LMNG	730,900
GR/CRNG	145,600
FPNG	106,400
BGNG	530,100
NNF (BRD)	unknown
SRMNF	unknown
TBNG	unknown

The amount of this habitat that is currently suitable for this species on each area is unknown.

Conservation Planning

There are no conservation plans for this species.

Direct and Indirect Effects on NFS Lands

Sprague's pipits are most likely affected by livestock grazing and prescribed burning.

Grazing

Grazed grasslands generally support fewer Sprague's pipits than ungrazed grasslands. Heavy grazing is often detrimental as it reduces vegetation height below levels acceptable to Sprague's pipits (Owens and Myres 1973, Dale 1984, Bock et al. 1993, Sutter 1996; but see Kantrud 1981 for Sprague's pipit use of heavily grazed pastures). However, lightly to moderately grazed grasslands are used throughout the breeding range (Owens and Myres 1973, Kantrud and Kologiski 1982, Bock et al. 1993, Anstey et al. 1995). In Alberta, Sprague's pipits preferred early-season native pastures (grazed in early summer), infrequently occupied early-season tame pasture (grazed from late April to mid-June) and continuously grazed native pastures, and were fairly common in deferred-grazed native pastures (grazed after 15 July) (Prescott and Wagner 1996).

Burning

Little information is available regarding effects of prescribed burning on Sprague's pipit populations, although the use of fire to retard shrubs would be ultimately beneficial. In North Dakota, Sprague's pipits were absent from unburned, idle grasslands; highest abundance was reached in areas 2 years after burns (Madden 1996). At one Saskatchewan site, Sprague's pipit populations declined the first 2 years following fall burns and then recovered to densities similar to those in unburned areas (Pylypec 1991).

Cumulative Effects

Continued conversion of rangeland to croplands can be expected to occur on private lands across the planning area (Ostlie et al. 1997, USDA Forest Service 2000), with those occurring in North Dakota being especially relevant to the viability of Sprague's pipit. The absence of prescribed fire on private land is likely to continue, thereby reducing long-term nesting habitat quality for this species, as shrub encroachment proceeds.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. These agreements are long term and collectively cover virtually all land suitable for grazing. The extensive areas under grazing permits limits management ability to prescribe burn large areas because of limited availability of alternative forage.

Conservation Measures and Mitigation

Keys to management include providing suitable grassland habitat, especially native prairie, with intermediate vegetation height and low visual obstruction. The U.S. Geological Survey has developed several management recommendations for Sprague's pipit (Dechant et al. 1999). Those most relevant to the types of management discussed in this document are:

- Maintain grasslands free of woody vegetation (Berkey et al. 1993, Anstey et al. 1995, Madden 1996).
- Burn grassland once every 2-4 years (Madden 1996). Populations can be expected to decline immediately after burning; vegetation must recover before Sprague's pipit will re-colonize areas.
- Avoid heavy grazing; throughout the breeding range, light to moderate grazing may be beneficial (Bock et al. 1993, Sutter 1996). Grazing tame pastures in spring allows native pastures to be deferred, which improves habitat in the native pastures for Sprague's pipits (Prescott and Wagner 1996).
- Convert non-native uplands, including hayland and pasture, to native vegetation (Berkey et al. 1993, Sutter 1996, Dale et al. 1997).

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

LMNG, GR/CRNG, SNG, FPNG, BGNG, NNF (BRD), SRMNF, TBNG

- Modify livestock grazing practices as needed to reduce adverse impacts of drought to food and cover for prairie grouse and other wildlife (Standard).
- Manage for native forb abundance and diversity to provide foraging habitat for big game, grassland birds, and other grassland wildlife (Guideline).
- Manage for high structure habitat in large blocks to provide habitat for waterfowl, prairie grouse, and other ground-nesting birds (Guideline).
- Where technically and economically feasible, use genetically local native plant species in revegetation efforts (Guideline).

LMNG, GR/CRNG, SNG

- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

LMNG, GR/CRNG, SNG, FPNG, BGNG, NNF (BRD), SRMNF, TBNG

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).
- Objectives are established for prescribe burning.

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

LMNG, GR/CRNG, SNG

- Continue monitoring populations and habitat.

LMNG, GR/CRNG, SNG, FPNG, BGNG, NNF (BRD), SRMNF, TBNG

- Monitor the effectiveness of the suggested stocking rates in Appendix I in meeting desired vegetation composition and grassland structure levels.

Appendices

LMNG, GR/CRNG, SNG, FPNG, BGNG, NNF (BRD), SRMNF, TBNG

- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

LMNG, GR/CRNG

Livestock grazing and prescribed burning are compatible with this species, as long as resulting vegetation and litter remain in suitable amounts. Because of the new direction on increasing prescribed burns, adding rest pastures, and increasing vegetative structural diversity and composition, overall habitat quality is expected to increase as a result of implementing Alternative 3. Therefore, the biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Outcome II is selected as the risk assessment for this species. In and near the Grand River, Cedar River, and Little Missouri National Grasslands, habitat is of sufficient quality, distribution, and abundance to allow the species to maintain populations across the units. There is no need for reintroductions or transplants.

SNG

Determination is “no impact.” The species presence on this national grassland has not been confirmed and documented. However, management direction is provided for this species and potential habitat on these areas.

BGNG, TBNG

Biological determinations are not made for this species on these areas since it is not listed as sensitive by Region 2 of the Forest Service. The conservation measures listed above are expected to enhance its habitat and/or protect the species and its habitat from possible adverse effects of Forest Service authorized activities and allocations.

FPNG, NNF (BRD), SRMNF

Determination is "no impact." The species is not a sensitive species in Region 2 of the Forest Service, and the species presence on this national grassland has not been confirmed and documented. However, management direction is provided for this species and potential habitat on these areas.

Upland Sandpiper (*Bartramia longicauda*)

Species Description

The upland sandpiper ranges from 11 to 13 inches in size. It is the most terrestrial of North American shorebirds. The sexes look alike. Breeding adults are scaly-brown above and light tan below, with a long slender neck, small rounded head, and a relatively long tail.

Initial nesting activity, which is thought to be somewhat synchronous, begins two to three weeks after spring arrival in breeding areas. The upland sandpiper's nest is a shallow depression in the ground approximately 4 inches in diameter and 2-inches deep, and is lined with dry grass. Nests are usually well hidden (Johnsgard 1981). Clutch size is normally four eggs. Incubation lasts an average of 24 days. Chicks are precocial and leave the nest within 24 hours after hatching (Ailes 1980). Broods are tended by one or both adults until the young attain adult weight and are capable of flight at 30-34 days (Buss and Hawkins 1939, Ailes 1980). Family groups tend to stay together at least until post-breeding migration.

Upland sandpipers feed almost exclusively on insects, especially grasshoppers and crickets (Orthoptera), weevils (Coleoptera), and other small invertebrates gathered from or close to the ground (Terres 1980). Occasional seeds of weeds, grasses and waste grains, including wheat, are also consumed (McAtee and Beal 1912).

Distribution and Status

Distribution

Upland sandpipers breed locally from north-central Alaska eastward across central Canada and through the Great Lakes region to southern New Brunswick, south in the interior to eastern Washington, northeastern Oregon, Idaho, Colorado, northwestern Oklahoma, Texas, central Missouri, southern Illinois, northern Kentucky, southern Ohio, West Virginia, central Virginia, and Maryland; formerly farther south. Populations are small and widely scattered in the northeastern U.S.

The species winters in South America from Surinam and northern Brazil south to central Argentina and Uruguay; the largest concentrations occur in Argentina and Uruguay.

Upland sandpipers arrive on their breeding grounds in mid-April to early May (Buss and Hawkins 1939, Ailes 1980). The time elapsed between arrival and departure from breeding areas has been observed to be as brief as 100 days and as long as 165 days (Buss and Hawkins 1939). Higgins and Kirsch (1975) correlated the average, frost-free period with dates of first nest initiation and final departure from breeding areas in North Dakota and Wisconsin, and suggested that some breeding ground activities may be directly or indirectly related to temperature at northern latitudes.

Table H-6 summarizes species occurrence and status in the planning area. It is known to occur on all planning units.

Status

Although declining in much of the Midwest and northeast, Breeding Bird Survey (BBS) data indicate a significant increase in central North America in recent decades (Droege and Sauer 1990). Rangewide, areas exhibiting increases far outnumber those showing declines and the BBS trend for 1966-1993 was a significant increase averaging 2.41% per year (Peterjohn et al. 1994).

In North Dakota, Montana, and Ontario, the upland sandpiper appears to be maintaining its numbers or increasing (Cadman et al. 1987). In Minnesota, Montana, and North and South Dakota, the 1985 Farm Bill has idled millions of acres of croplands through the Agriculture Conservation Reserve Program, potentially creating new habitat. Statistically significant annual increases in relative abundance have been registered in the High Plains Border (8.5%, P <= to 0.05) and Missouri Plateau-Glaciated (11.8%, P <= 0.05) strata of the Great Plains Physiographic Region.

Initial declines were due largely to market hunting. The species has disappeared or declined in portions of the eastern U.S. due to destruction (urban sprawl) and natural succession of habitat, and, probably, frequent disturbance of pastures and hayfields (cut too often to allow breeding). Extensive row-cropping and early crop-cutting probably pose threats to breeders. Some western populations may have declined due to overgrazing. Much of the wintering habitat has been usurped by agriculture. Loss and fragmentation of habitat due to increased urbanization, changes in farming practices and natural forest succession pose the most serious threats to populations.

Organization Rankings

Upland sandpipers have a global conservation rank of G5. The upland sandpiper is classified as a sensitive species by Region 2 of the Forest Service.

Habitat

General

In general, nesting upland sandpipers use grassland areas with low to moderate forb cover, low woody cover, moderate grass cover, moderate to high litter cover, and little bare ground (Buss and Hawkins 1939, Rotenberry and Wiens 1980, Renken 1983, Skinner et al. 1984, Kantrud and Higgins 1992, Hull et al. 1996). Fence posts or other display perches may be important components of suitable habitat (White 1983). Suitable habitat includes native and tame grasslands, wet meadows, hayland, pastures, planted cover, cropland, highway, and railroad rights-of-way, and grassy areas of airports (Dechant et al. 1999).

In North Dakota, South Dakota, Montana, Wyoming, Colorado, and Nebraska, densities of upland sandpipers were highest in areas with moderately grazed typic ustoll soils (Kantrud and Kologiski 1982). Upland sandpipers were associated with silty range and thin upland range sites in North Dakota; these sites were characterized by thin topsoil, loamy soil, 1-25% slope, grassy cover, low shrub cover, and moderate to high litter cover (Messmer 1990). Maximum vegetation height ranged from 20 to 28 inches (50 to 70 cm) and average litter depth ranged from 1.50 to 3.6 inches (3.8 to 9.1 cm). Sedivec (1994), however, in the same study area found that upland sandpipers preferred overflow range sites (areas receiving more than normal soil moisture because of run-off from higher land or from flooding) to silty range sites.

No clear pattern of preference for native versus tame vegetation over the breeding range of the upland sandpiper is discernible. In a study encompassing Great Plains grasslands, areas considered to be the best habitat for upland sandpipers were dominated by wheatgrass and Kentucky bluegrass, followed by green needlegrass, buffalo grass, western snowberry, and slimspike three-awn (Kantrud and Kologiski 1982). Dominant vegetation at nest sites in North Dakota, South Dakota, Montana, and Manitoba were Kentucky bluegrass, smooth brome, needle-and-thread, and quackgrass; although most nests were located within mixed-grass, upland sandpipers readily nested in stands of tame grasses (Kantrud and Higgins 1992). King and Savidge (1995) observed upland sandpipers in CRP fields seeded with warm-season grasses and native tallgrass in Nebraska. Within ungrazed grasslands in North Dakota and South Dakota, 38 of 41 nests were in either native or tame grasses located in idle fields or in rights-of-way. One of these nests was in alfalfa and brome (Higgins et al. 1969). The other three nests were in pasture. Within grazed grasslands in North Dakota, vegetation within 3.3 feet (1 m) of nests was composed of native grasses and small amounts of tame grasses such as Kentucky bluegrass and smooth brome (Bowen and Kruse 1993). In South Dakota, upland sandpipers nested only in native prairie; 32 of the 33 nests were in prairie classified as in good or excellent range condition (Kaiser 1979). In Manitoba, numbers of upland sandpipers were positively correlated with presence of native vegetation and negatively correlated with presence of tame vegetation (Wilson and Belcher 1989). In Saskatchewan, upland sandpipers were present in low abundance in both native mixed-grass and tame grasslands dominated by crested wheatgrass (Sutter and Brigham 1998).

Nest

Upland sandpipers nest in a variety of habitats and vegetation heights and densities, from idle prairie with dense, homogeneous vegetation to wet meadows, oldfields, pastures, hayland, cropland, tame vegetation, burned areas, and sandy areas with sparse vegetation NatureServe 2000). Nests may occur in depressions covered by grass arching over the top, in grass clumps, in dense vegetation, or at the base of forbs or shrubs (Lindmeier 1960, Skinner et al. 1984).

Vegetation height around the majority of nests ranges from 4 to 25 inches (10.2 to 63.5 cm) (Lindmeier 1960, Higgins et al. 1969, Kaiser 1979, Buhnerkempe and Westemeier 1988, Eldridge 1992). In North Dakota, South Dakota, Montana, and Manitoba, nests were located in grass-dominated sites with 100% visual obstruction at <5.9 inches (15 cm), effective vegetation height <11.8 inches (30 cm), and 30-99% litter cover (Kantrud and Higgins 1992). Upland sandpipers avoided nesting where visual obstruction was >15.7 inches (40 cm) or vegetation height was >33.5 inches (85 cm). In South Dakota, nest concealment for nests in grazed prairie was measured from various angles: all nests had $\geq$50% vertical concealment by residual and living vegetation, 33% of nests were concealed on all sides, 55% were concealed on two sides, and 12% had no side concealment (Kaiser 1979). In North Dakota, upland sandpipers most commonly nested in areas where grass accounted for $\geq$50% canopy cover and forbs for <50% canopy cover (Bowen and Kruse 1993). Other habitats used for nesting were as follows:

- Those in which forbs accounted for $\geq$50% canopy cover and grass for <50% canopy cover.
- Those in which western snowberry with a grass understory accounted for <50% canopy cover.
- Those in which grass accounted for $\geq$50% canopy cover and forbs for <50% canopy cover.

Habitats in which western snowberry with a grass understory accounted for ≥50% canopy cover were avoided.

Moderate amounts of forbs may be an important component in suitable nesting habitat (Skinner 1975, Renken 1983, Buhnerkempe and Westemeier 1988, Hull et al. 1996, Klute et al. 1997). Upland sandpipers require grasslands of various heights for rearing broods.

Forage

In general, upland sandpipers forage within short vegetation and nest and rear broods within taller vegetation. However, time of day, daily activities, and phase of nesting cycle also influence habitat use (Dorio and Grewe 1979 in DeChant et al. 1998). Upland sandpipers prefer vegetation less than 12 inches (<30 cm) tall for foraging, and make use of a variety of habitats, including heavily grazed pastures, mowed hayfields, fallow and cultivated fields, and burned areas. In Minnesota, both young and adults preferred to feed in vegetation <4 inches (10 cm) high (Dorio 1977, Dorio and Grewe 1979). In Nebraska, upland sandpipers foraged in wheat stubble (Bates 1907).

The acres of grassland habitat (<25% slope) on each of the planning units are as follows:

Planning Unit	Acres of Potential Grassland Habitat
LMNG	730,900
GR/CRNG	145,600
FPNG	106,400
BGNG	530,100
NNF (BRD)	unknown
SRMNF	unknown
TBNG	unknown

The amount of this habitat that is currently suitable for this species on each area is unknown.

Direct and Indirect Effects on NFS Lands

Livestock grazing, burning and mowing can alter the suitability of grassland habitat for nesting, brooding and foraging (Kirsch and Higgins 1976, Ailes 1980, Higgins, et al. 1969).

Grazing

It is difficult to give a general statement on effects of grazing on upland sandpipers. Upland sandpipers use grazed areas for nesting, foraging and brood rearing (Dorio 1977). Nest loss occasionally occurs as a result of trampling by cattle (Buss and Hawkins 1939; Ailes1980; Dorio 1977; Bowen and Kruse 1993). Four studies were designed to determine the effect of grazing on productivity. Messmer (1990) and Sedivec (1994) compared rotational grazing systems, specifically short-duration grazing and twice-over rotation grazing, to season-long grazing and to idle grasslands. Short-duration grazing involves a system of pastures rotated through a grazing schedule of about 1 week grazed and 1 month ungrazed, repeated throughout the season (usually late May or early June until October). Twice-over rotation involves grazing a number of pastures twice per season, with about a 2-month rest in between grazing. Season-long grazing involves leaving cattle on the same pasture all growing season. Bowen and Kruse (1993) and Kirsch and Higgins (1976) examined seasonality and intensity of grazing, respectively. All four studies were conducted in southcentral North Dakota in mixed-grass prairie.

Research by Messmer (1985, 1990) revealed that nest density and nest success were higher with twice-over deferred and season-long grazing systems than on idle pastures, but that average density of breeding sandpipers was highest on the short-duration grazing system. In a continuation of Messmer's study, Sedivec (1994) reported that nest density was significantly higher on grazed than on idle grasslands. Both authors concluded that grazing is compatible with breeding needs of upland sandpipers

Bowen and Kruse (1993) compared nest density between the four grazing practices of autumn grazing, autumn-and-spring grazing, season-long grazing, and spring grazing to non-grazed areas. Nest densities were lower in pastures subjected to grazing during the nesting season (autumn-and-spring grazing, season-long grazing, and spring grazing) than in control fields or fields with autumn grazing. Nest densities did not differ between spring grazing with high stocking density to that of season-long grazing with low stocking density. Nest densities were significantly lower in years after pastures had been subjected to season-long and autumn-and-spring grazing than in the year before grazing treatments occurred (Bowen and Kruse 1993).

Within mixed-grass and tallgrass prairie in South Dakota, nest densities did not differ between idle sites and sites that were grazed in May at a grazing rate that resulted in 20-80% of the current year's growth being removed (Kaiser 1979). Fourteen nests were found within a 650-acre fragment of moderately grazed prairie in South Dakota (Lokemoen and Duebbert 1974 in DeChant et al. 1999). In North Dakota, South Dakota, Montana, and Manitoba, nest success was higher in idle grasslands than in grazed pastures (Kantrud and Higgins 1992).

The following researchers looked only at presence or density of upland sandpipers on grazed areas, but not specifically at productivity. Kantrud (1981) found that upland sandpipers were more attracted to heavily grazed native grasslands in North Dakota than either lightly or moderately grazed, or mowed grasslands, although densities were relatively high in all habitats compared to other bird species. Over a broader range (North Dakota, South Dakota, Montana, Wyoming, Colorado, Nebraska), however, sandpiper densities were highest on moderately grazed typic ustoll soils, and no relationship between density and grazing intensity was found (Kantrud and Kologiski 1982). Upland sandpiper densities were significantly higher in idle and grazed mixed-grass than in tame dense nesting cover (DNC); they also occurred in areas 1 year post-grazing (Renken 1983, Renken and Dinsmore 1987). In Nebraska, upland sandpipers were present on areas grazed by cattle and areas that were both grazed by American bison and burned (Griebel et al. 1998).

In Nebraska, avian diversity and density were higher on grazed than ungrazed areas because of the presence of upland sandpipers; sandpipers were not present on ungrazed areas (Cole and Sharpe 1976).

Bowen and Kruse (1993) found that allowing mixed-grass prairie to remain idle for 2-3 year between grazing treatments was not detrimental to breeding upland sandpipers.

Burning

Prescribed burning is likely to have both beneficial and detrimental impacts on upland sandpiper breeding habitat. In general, habitat burned before the nesting season is not used for nesting that year. Displaced birds may then be forced to nest in less favorable habitat, such as cultivated fields. In subsequent years however, areas previously treated with fire are preferred. In mixed-grass prairie, upland sandpipers were most abundant immediately following a burn and 1 year post-burn, as compared to 2-15 years after the burn (Johnson 1997). In Saskatchewan, upland sandpipers used a burned plot 2-3 years after a burn but were not

observed on an unburned plot (Pylypec 1991).

Kirsch and Higgins (1976) reported that mean nest productivity was lowest on tilled areas (where no nests were observed), higher on grazed and idle areas, and highest on burned areas. The highest nest density of 6.8 nests / 100.1 acres (40.5 ha) was on a grassland burned 2 years previously. Upland sandpipers used a burned native pasture in South Dakota significantly more than an unburned pasture (Huber and Steuter 1984).

Mowing

Upland sandpipers occurred at higher densities in hayland than pasture and wet prairie in Wisconsin, although differences in densities were not statistically significant (DeChant et al. 1999). However, mowing may cause nest failure: three destroyed nests were found in a Nebraska alfalfa field following mowing (Ducey and Miller 1980). In North Dakota, upland sandpipers used previously idled areas only after mowing (Messmer 1990). Upland sandpipers were located in annually mowed native prairie in Iowa (Kendeigh 1941).

Cumulative Effects

In addition to livestock grazing, mowing, and haying, continued conversion of rangeland to croplands could be expected to occur on private lands throughout Wyoming, the Dakotas, and Nebraska (Ostlie et al. 1997, USDA Forest Service 2000). Prescribed fire will be minimal on those lands.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

Key to management is providing grasslands of various heights with few shrubs. Upland Sandpipers require short vegetation for foraging, taller vegetation for nesting, and short to medium vegetation for brood cover. The U.S. Geological Survey (Dechant et al. 1999) made several management recommendations relevant to the planning units:

- Maintain large (>250 acres), contiguous tracts of prairie to reduce edge, provide habitat heterogeneity, and to decrease nest depredation (Herkert 1994). Blocks should be within 1 mile (1.6 km) of each other and be contiguous with grassy habitats (e.g., pasture, hayfields).
- Maintain native prairie by implementing burning, grazing, or haying treatments, or leaving idle, every 2-3 year (Kaiser 1979, Kantrud 1981). In North Dakota, spring-burning at 3 year intervals provided habitat conditions needed by upland sandpipers for nesting; grazing did to a lesser extent, but was more compatible than cropland or seeding tame grasses (Kirsch and Higgins 1976).
- Allow some blocks of grassland to be undisturbed to serve as nesting cover (Lindmeier 1960, Bowen and Kruse 1993).

Conservation Measures and Mitigation, cont.

- Avoid burning, mowing, or plowing during the nesting season (Buss and Hawkins 1939, Lokemoen and Beiser 1997). Mowing of nesting and brooding habitat should be delayed until 1 July or later (Buhnerkempe and Westemeier 1988).
- Provide display perches, such as fence posts, rock piles, or tree stumps (White 1983).
- Prevent encroachment of woody vegetation.
- A complex of fields of different management practices may be necessary to meet upland sandpiper needs during the breeding season. Grazed, burned, and hayed fields provide suitable habitat for feeding, loafing, and brood rearing, but undisturbed fields are needed for nesting (Bowen and Kruse 1993). Provide a mosaic of habitat types, such as grassland of various heights and densities as well as cropland, to provide for the needs of upland sandpiper throughout the breeding season (Bolster 1990 in Dechant et al. 1999).
- Annually burn 20-30% of grassland fragments <198 acres (80 ha) (Herkert 1994). Small fragments should have <50% of their area burned at a time, and, if next to other fragments, should be burned in a rotating manner that allows unburned fragments to be next to burned fragments. Burns should occur from March to early April or October to November.
- Graze at moderate levels to provide diverse grass heights and densities (Skinner 1975).
- Graze using a rotational system of two or more grazing units to increase grass heights and densities within and among units.
- Avoid season-long grazing; where grazing is necessary, delay grazing until mid- to late June to maintain nest densities (Bowen and Kruse 1993, Sedivec 1994). Choose rotational grazing over season-long grazing to provide more undisturbed cover during the nesting season by deferring two or more pastures until mid- to late June (Sedivec 1994). With rotational grazing systems, delay grazing until late May to early June to benefit nesting sandpipers as well as to optimize calf performance. Follow stocking rates as outlined by the U.S. Soil Conservation Service (1984); rates may be slightly higher for rotational grazing (Sedivec 1994).
- Moderate grazing may provide suitable habitat in both native and tame grasses, but more research needs to be done.

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

All Planning Units

- Modify livestock grazing practices as needed to reduce adverse impacts of drought to food and cover for prairie grouse and other wildlife (Standard).
- Delay mowing of grasslands until July 15 or later to protect ground-nesting birds, including their nests and young broods (Guideline).
- Manage for high structure habitat in large blocks to provide habitat for waterfowl, prairie grouse, and other ground-nesting birds (Guideline).

- Design and implement range management strategies for meeting desired vegetation objectives using existing monitoring information and suggested stocking rates (Appendix I) (Standard).
- Delay livestock turn-on dates until June 15 or later in areas grazed in the previous grazing season to provide quality nesting cover for upland game birds (Guideline).
- Manage for native forb abundance and diversity to provide foraging habitat for big game, grassland birds, and other grassland wildlife. Guideline

FPNG, BGNG, ONG, NNF (PRRD), NNF (BRD), SRMNF, TBNG

- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

All Planning Units

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).
- Objectives are established for prescribe burning.

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

FPNG, BGNG, ONG, NNF (PRRD), NNF (BRD), SRMNF, TBNG

- Continue monitoring populations and habitat.

All Planning Units

- Monitor the effectiveness of the suggested stocking rates in Appendix I in meeting desired vegetation composition and grassland structure levels.

Appendices

All Planning Units

- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

FPNG, BGNG, ONG, NNF (PRRD), NNF (BRD), SRMNF, TBNG

Upland sandpipers will be affected by livestock grazing and prescribed burning. Both of these activities are compatible with this species, as long as resulting vegetation and litter remain in suitable amounts. Because of the new direction on increasing prescribed burns, adding rest pastures, and increasing vegetative structural diversity and composition, overall habitat quality is expected to increase as a result of implementing Alternative 3. Therefore, the biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide".

Outcome I is selected as the risk assessments for this species on each planning unit. Habitat is well distributed and of sufficient quality to maintain the species' presence. The upland sandpiper has excellent dispersal capabilities, and no active population management in terms of reintroductions or transplants is necessary.

Loggerhead Shrike (*Lanius ludovicianus*)

Species Description

The loggerhead shrike is slightly smaller than the American robin; total length averages about 9 inches (23 cm). The loggerhead shrike has a stout, hooked, all-dark bill, bluish-gray head and back, white underparts, a broad black mask extending above the eyes, a gray to whitish rump, a black tail with white tip, and large white patches in the black wings.

In the planning area, the loggerhead shrike's breeding season begins in April. It builds a bulky nest of coarse twigs in a small tree or large shrub. Clutch size usually averages 4-5 eggs. Incubation lasts 14-16 days. The male feeds the female during incubation. Young are tended by both adults, fledge in about 17-21 days, and are independent in 40-45 days (Baicich and Harrison 1997).

The loggerhead shrike feeds primarily on large insects (especially crickets, beetles and grasshoppers), but also preys on other invertebrates, small birds, lizards, frogs, and rodents (Fraser and Luukkonen 1986, Gillihan and Hutchings 2000). Its diet varies with season and location; in parts of the range, most of the food eaten in winter may be vertebrates. The species captures prey usually via a short flight from a perch; sometimes hovers kestrel-like or walks when foraging (Luukkonen 1987). The loggerhead shrike sometimes impales food items on a plant thorn or on barbed wire (Fraser and Luukkonen 1986); such items may be eaten later or fed to young (Applegate 1977).

Distribution and Status

Distribution

Loggerhead shrikes breed from Washington, northern Alberta, central Saskatchewan, and southern Manitoba, south to California and Florida, and east to southwestern Minnesota, southern Wisconsin, southern Michigan, and Maryland (National Geographic Society 1987). They winter in the southern half of their breeding range, south to the Gulf Coast, southern Florida, and into Mexico (NatureServe 2000).

Loggerhead shrikes return from their wintering grounds from mid-February to early May. Fall migration stretches from about August to late October, with some stragglers leaving the breeding grounds in November (Stewart 1975, Janssen 1987, Yosef 1996).

Table H-6 summarizes species occurrence and status in the planning area. The species is known to occur on all planning units.

Status

Although the loggerhead shrike is still widespread and common in some areas, it has been declining throughout North America since the 1960s, and perhaps earlier. The decline is particularly severe in the northeastern and north-central regions. The species is now extirpated from most of the Northeast, and is nearly extirpated from Minnesota, Wisconsin, and Michigan. Part of the decline can be attributed to reforestation and loss of open habitat and thus represents a return to pre-settlement conditions when shrikes were probably absent from much of the heavily forested northern states. However, the decline has proceeded beyond what can be explained by habitat loss, as much suitable habitat remains unoccupied in most northern states. Further, decline has been recorded in all regions of the country, even those with much open habitat. The decline remains unexplained. Pesticides, loss of wintering habitat quality, and/or dependency on roadside habitat with high predation pressure have been suggested as possible causes.

The loggerhead shrike has declined significantly nearly rangewide (Robbins et al. 1986). A slow decline began in the 1930s and continued until the late 1960s and 1970s when the decline accelerated (Fruth 1988). Breeding Bird Survey (BBS) data for the period 1966-1989 indicate a 55% population decline nationally, 47% in the central states, and 59% in the western states. Since shrike declines began before 1966, these are conservative figures for overall declines during the past century. Christmas Bird Count data for 1961-1978 documented a 22% decline in winter sightings nationwide (Morrison 1981).

Robbins et al. (1986) summarized the BBS data from 1965 to 1979 and gave a more detailed look at the geographic pattern of decline. The loggerhead shrike was one of the few species that showed a significant decrease in all three regions (Eastern, Central, Western). Significant declines were recorded in four out of seven subregions (Southwestern States, Northern Plains States, Canada, and the Southeastern States). Eleven strata widely distributed across the country had significant decreases, and none had increases in shrikes counted. Of the states, only South Dakota showed a significant increase, while the following states and provinces had large enough samples to show significant declines: Nevada, Texas, Oklahoma, Kansas, North Dakota, Saskatchewan, Ontario, Iowa, Missouri, Arkansas, Mississippi, Tennessee, Kentucky, Georgia, North Carolina, and Virginia. As of 1979, the largest populations were on the Florida Peninsula, in New Mexico, and in Oklahoma (Robbins et al. 1986) (but outlook for survival in southwestern Oklahoma is not good--Tyler 1992).

The Commission for Environmental Cooperation (2000) provides additional detailed information on the status of this species across its range.

Organization Rankings

Loggerhead shrikes have a global conservation rank of G5 and are classified as a sensitive species by Regions 1 and 2 of the Forest Service. The Committee on Environmental Cooperation, established under the North American Free Trade Act, has identified the loggerhead shrike as a priority grassland species for conservation action.

Habitat

Loggerhead shrikes prefer open habitat characterized by grasses and forbs of low stature interspersed with bare ground and shrubs or low trees. Loggerhead shrikes use prairies, pastures, sagebrush desert, and fencerows or shelterbelts of agricultural fields, as well as old orchards, riparian areas, open woodlands, farmsteads, suburban areas, mowed road rights-of-way, abandoned railroad rights-of-way, cemeteries, golf courses, and reclaimed strip mines (Dechant et al. 1998, NatureServe 2000). Scattered shrubs or trees, particularly thick or thorny species, serve as nesting substrates and hunting perches (Porter et al. 1975, 1994, Woods 1995*a*, Yosef 1996). Thorny shrubs or trees also serve as impaling stations. In the upper Midwest, abundance of open habitat, foraging areas, and elevated perch sites were considered the most important factors in habitat suitability (Brooks and Temple 1990*a*).

In Canada, loggerhead shrikes breed in pastures with isolated trees and shrubs, thickets, or hedgerows, and in thorny bushes along railroad rights-of-way. In southeastern Manitoba, willow shrubs growing alone or in clumps and deciduous trees growing in shelterbelts were preferred as nesting sites; these sites contained significantly more pasture, fewer trees, and longer fencerows than randomly selected sites. In southeastern Alberta, breeding habitat had more buffaloberry shrubs, higher percentage of grass $\geq$8 inches (20 cm), and taller mean height of grass and forbs than heavily grazed unoccupied habitat (Prescott and Collister 1993).

Foraging

Loggerhead shrikes usually forage over areas of shorter grass, probably because prey is easier to detect in shorter vegetation. However, in Canada's shortgrass habitat, loggerhead shrikes preferred to forage in tall (> 8 inches) grass of ungrazed areas (Prescott and Collister 1993). In southeastern Alberta, foraging loggerhead shrikes preferred native pasture and pastures of forage crops, avoided cereal crops and native and introduced vegetation within railroad rights-of-way, and used fallow fields in proportion to their availability. However, foraging success was found to be highest in railroad rights-of-way. The tall and dense vegetation in rights-of-way may be important for vertebrate prey during times when arthropod prey is scarce.

Conservation Planning

A conservation strategy has not been prepared for this species. The need for a range-wide comprehensive management plan for the species has been identified by the Committee on Environmental Cooperation (2000).

Direct and Indirect Effects on NFS Lands

Loggerhead shrikes can be affected by livestock grazing, mowing, burning, and pesticides.

Grazing/Mowing

Grazing can provide preferred foraging habitat by shortening vegetation in taller grassland areas, such as might exist on the Sheyenne National Grassland. Trees and shrubs used for nesting and perches can be impacted by cattle grazing and rubbing (Yosef 1996). Loggerhead shrike in Alberta preferred to forage in ungrazed areas, which provided taller ($\geq$8 inches) grass (Prescott and Collister 1993). Light grazing to reduce vegetation height may be beneficial to shrikes in the upper midwest. Moderate haying or grazing in Manitoba may increase loggerhead shrike productivity.

Burning

To maintain loggerhead shrike habitat, burning may be used to provide dense herbaceous cover and prevent woody vegetation from dominating an area, but cautioned against burning too frequently and eliminating all trees and shrubs. Patchily burning late seral big sagebrush and antelope bitterbrush communities may provide the high horizontal and vertical structural diversity preferred by breeding loggerhead shrikes in shrub steppe communities.

Pesticides

Little information is available concerning the effects of pesticides on loggerhead shrike populations breeding in the Great Plains. However, it's suspected that broad-scale grasshopper spraying projects could impact this species.

Cumulative Effects

Loss of grasslands on private lands throughout the planning area and lack of management involving prescribed fire and grazing to promote adequate vegetative structure diversity are likely to continue (Ostlie et al. 1997, USDA Forest Service 2000). Additional threats that may be affecting this species in the planning area and across its range include habitat fragmentation, vehicle collisions, pesticides, increased human disturbance, climate change, and interspecific competition (Commission on Environmental Cooperation 2000).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. These agreements are long term and collectively cover virtually all land suitable for grazing which are also the lands suitable for the loggerhead shrike. Consequently, there is little to no land left idle. The extensive area under grazing permits reduces the opportunity to burn large areas, since few areas are available for alternative forage

Conservation Measures and Mitigation

Key to management for the loggerhead shrike is providing grassland with scattered trees and shrubs for foraging, nesting, and perching. The U.S. Geological Survey has developed several management recommendations for the loggerhead shrike (Dechant et al. 1998). Those most relevant to the types of activities outlined in this document are:

- Provide areas that are large enough to support several average-sized territories (about 1-60 acres / territory) of asymmetrical shape (Yosef 1996).
- Maintain low, thick shrubs and trees along fence lines and throughout otherwise open pastures and fields (Kridelbaugh 1982, Yosef 1996).
- In areas with taller vegetation, implement grazing where pastures provide suitably short vegetation for loggerhead shrike foraging. Pastures often are preferred habitat in Missouri (Kridelbaugh 1983), Illinois (Smith and Kruse 1992), and Kansas (Eddleman 1974 in DeChant et al. 1999). However, a few areas of tall grass should be maintained within pastures as they serve as food reserves for small mammals, which are potential loggerhead shrike prey.

Conservation Measures and Mitigation, cont.

- In areas with naturally short vegetation, control grazing and mowing to increase areas of taller grass (≥8 inches) (Prescott and Collister 1993, Yosef 1996). Although loggerhead shrikes prefer to forage in short grass, foraging success may be higher in tall grass areas, where vertebrate prey abundance is higher (Collister 1994 in DeChant et al 1998).
- Maintain herbaceous cover by burning at a frequency that will prevent woody vegetation from dominating the area, but not completely eliminate it. Yosef (1996) suggested that trimming or manual removal of shrubs and trees might be used to manage woody vegetation, in place of herbicides or frequent mowing.
- Use fencing or other methods to protect old shelterbelts and nesting bushes from cattle grazing and rubbing (Yosef 1996). Linear habitats may be improved by manipulating cover density, planting multiple rows of trees in shelterbelts, adding larger blocks of habitat adjacent to strips of woody vegetation, or planting thorny, native vegetation in fencerows (Kridelbaugh 1982).

Gillihan and Hutchings (2000) also provide management recommendations for this species and its habitat.

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

All Planning Units

- Design and implement livestock grazing strategies to provide for thick and brushy understories and multi-story and multi-age structure in riparian habitats, wooded draws, and woody thickets, contingent on local site potential (Guideline).
- Manage livestock grazing to maintain or improve riparian / woody draw areas (Guideline).
- Implement management practices that will move at least 80% of riparian and wooded draw areas toward self-perpetuating tree and shrub regeneration (Objective).
- Conduct actions so that habitats are maintained or improved toward robust stream health (Standard).
- Prohibit control of native insects until an evaluation of impacts to other resources is made (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

All Planning Units

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).
- Objectives are established for prescribe burning.

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

All Planning Units

- Monitor populations and habitat.
- Monitor the extent that riparian area vegetation is regenerating.
- Monitor the effectiveness of the suggested stocking rates in Appendix I in meeting desired vegetation composition and grassland structure levels.

Appendices

All Planning Units

- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

All Planning Units

Loggerhead shrikes will be affected by livestock grazing and prescribed burning. Both of these activities, as well as mowing, are compatible with loggerhead shrike, as long as resulting vegetation remains in suitable amounts to support prey populations. Because of the new direction on increasing prescribed burns, protecting woody habitats from livestock grazing, adding rest pastures, and increasing vegetative structural diversity and composition, overall habitat quality is expected to increase as a result of implementing Alternative 3. Therefore, the biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide".

Outcome II is selected as the risk assessment for this species these areas. There are no significant gaps in the species historic distribution, either on the planning units or in the planning area (there are significant gaps in the species' historic range outside the planning area). Habitat quality on the planning units is of sufficient quality and distribution to allow the species to persist.

Baird's Sparrow (*Ammodramus bairdii*)

Species Description

The Baird's sparrow is a small (5 inch long) grassland sparrow, similar in appearance to the savannah sparrow. The Baird's strong buffy coloration of crown and nape however, and much sparser breast streaking distinguish it from the savannah sparrow.

Nesting occurs from late May through mid-August, with some evidence that the species may be double-brooded (Johnson et al. 1998). Baird's sparrows nest on the ground, typically under a grass tuft or low shrub, and lay 3-6 eggs. Incubation lasts about 11 days and is done by the female alone. The young stay in the nest for 8-10 days, fledge at 13 days, and wander at 19 days (Baicich and Harrison 1997).

Brown-headed cowbirds will parasitize Baird's sparrow nests, the incidence of which may be increasing. In the past, anecdotal observations indicated that Baird's sparrows were rare cowbird hosts apparently because nests placed in open grasslands were inconspicuous to female brown-headed cowbirds (Lane 1968). More recent studies in Canada, however, indicated that parasitism rates varied from 0% of 11 nests to 36% of 76 nests (Davis and Sealy 1998).

During the breeding season, Baird's sparrows rely mostly on small insects for food. Grasshoppers and spiders are particularly important as food for nestlings. During winter, their diet consists primarily of seeds.

Distribution and Status

Distribution

Breeding Baird's sparrows are endemic to the northern Great Plains, nesting from southern Alberta to southern Manitoba, and from northern and eastern Montana through western Minnesota (National Geographic Society 1987). Within this range, birds may change their breeding areas, and even the types of habitat preferred, between years in response to environmental conditions. In general, the species is most abundant in the western part of its range when wet cycles produce dense vegetation in the more productive portions of the eastern mixed grass prairie. During droughts, this pattern is reversed. The species winters in southeastern Arizona, southwestern New Mexico, western Texas, and northern Mexico (Goossen et al. 1992). Baird's sparrows may arrive on the breeding grounds as early as late April, with peak arrival occurring in early to mid-May. The species departs its breeding grounds from mid-September to October.

Table H-6 summarizes species occurrence and status in the planning area. Baird's sparrows are known to nest on the Little Missouri and Grand River / Cedar River National Grasslands. During dry years, they may nest on the Sheyenne National Grassland. They are rare migrants on the Fort Pierre and Thunder Basin National Grasslands and may also be present on the Buffalo Gap National Grassland.

Status

Although estimated occurrence and population numbers still appear substantial, conservation concern for Baird's sparrows is high. This is due to the species' restricted range, spotty distribution and habitat selectivity, along with both recent and long-term population and range declines, and the fact that little of the species' range is protected. The decline of the species is related to agricultural impacts (Kantrud 1981), such as heavy grazing and the conversion of habitat to agriculture (Sutter and Brigham 1998)

The North American Breeding Bird Survey (BBS) indicates a non-significant decline for 1966-1996 (-1.6 percent annual change, $P = 0.29$; $n = 115$; Sauer et al. 1997). A significant decline, however, was recorded survey-wide for 1966-1979 (-4.7 percent annual change; $P = 0.02$; $n = 52$). This is added to apparent historical declines of habitat: 80 percent of short-grass and 75 percent

of mixed grass prairie. From 1970-1985, the species declined 35-55 percent in Canadian prairie provinces (De Smet and Miller 1989).

In some areas of North Dakota, the Baird's sparrow was so common historically that it outnumbered all other birds combined (Lane 1968). Since the 1880's, 75 percent of the virgin prairie in North Dakota has been lost, and numbers of Baird's sparrow have been drastically reduced (Stewart 1975).

In 1967, the Baird's sparrow population in North Dakota was estimated at 369,000 pairs (Stewart and Kantrud 1972). However, BBS data indicate a 2.58 percent annual decline from 1966-1990 (Johnson and Schwartz 1993). A recent estimate is 224,700 breeding pairs in North Dakota for 1992-1993 (Johnson and Igl 1995).

Organization Rankings

The Baird's sparrow is classified as a sensitive species in Regions 1 and 2 of the Forest Service and has a global conservation rank of G4. It was petitioned for listing as threatened under the Endangered Species Act in July 1997; listing was found to be not warranted in May 1999 (Federal Register 64:27747-27749). The species is given a ranking of extremely high priority on the 1998 Watch List, and a high priority ranking on the 1996 WatchList (Carter et al. 1996). It is also listed as a "High Priority" species on the North and South Dakota Watch Lists.

Habitat

The Baird's sparrow is a grassland specialist, preferring idle native or idle tame grasslands, and lightly to moderately grazed pastures (Owens and Myers 1973, Stewart 1975, Kantrud and Kologiski 1982, Sutter 1996, Davis and Duncan 1999). They sometimes use planted cover (e.g., Conservation Reserve Program and dense nesting cover), dry wetland basins, wet meadows, and dense stands of grass within hayland and cropland (Lane 1968, Stewart 1975, Renken 1983, Johnson and Schwartz 1993, Davis et al. 1996). General habitat requirements include moderately deep litter and vegetation height of >8 inches (20 cm) (De Smet and Conrad 1991 in DeChant et al. 1998). Areas with dense shrub patches are avoided.

Native prairie traditionally is regarded as optimal breeding habitat. Some studies have shown that Baird's sparrows exhibit a preference for native grasses (Winter 1994, Madden 1996). However, some studies in Canada have found no preference between native and tame grasslands and suggest that Baird's sparrows respond more strongly to vegetative structure than to species composition (Anstey et al. 1995, Davis et al. 1996). Tame stands of smooth brome and other broad-leaved grasses may be avoided, while stands of tame, narrow-leaved grasses (e.g., crested wheatgrass) are readily used (Dale 1992, Anstey et al. 1995, Madden 1996).

Within grazed mixed-grass areas in North Dakota, abundance of Baird's sparrows was positively associated with percent club moss cover and plant communities dominated solely by native grass (*Stipa, Bouteloua, Koeleria,* and *Schizachyrium*) (Schneider 1998). Abundance was negatively associated with percent grass cover, litter depth, visual obstruction (vegetation height / density), vegetation density, density of low-growing shrubs (western snowberry and silverberry), plant communities dominated by Kentucky bluegrass and native grass, and plant communities dominated by wet-meadow vegetation. Strongest vegetation predictors of the presence of Baird's sparrows were increasing clubmoss cover, decreasing bare ground, and decreasing litter depth.

The acres of grassland habitat (<25% slope) on each of the planning units are as follows:

Planning Unit	Acres of Potential Grassland Habitat
LMNG	730,900
GR/CRNG	145,600
FPNG	106,400
BGNG	530,100
ONG	83,839
NNF (BRD)	unknown
SRMNF	unknown
TBNG	unknown

The amount of this habitat that is currently suitable for this species on each area is unknown.

Conservation Planning

Goossen et al. (1992) prepared a Recovery Plan for the species in Canada. The USDI Fish and Wildlife Service (Jones and Green 1998) prepared a status assessment and conservation plan for Baird's sparrow.

Direct and Indirect Effects on NFS Lands

Baird's sparrow habitat is most likely to be affected by livestock grazing, burning, and mowing. In order to remain suitable for Baird's sparrows, grasslands need periodic disturbances such as these; the optimal frequency of which varies regionally and by vegetative composition (Renken 1983, Dale et al. 1997). Generally, long-term idled habitats with thick vegetation and dense litter are avoided by Baird's sparrows (Renken 1983, Johnson and Schwartz 1993, Hartley 1994, Winter 1994, Madden 1996). However, in drier portions of the species' range, such as the Little Missouri National Grassland, idle grasslands with moderate litter and minimal shrub cover can support high densities of breeding Baird's sparrows (Owens and Myres 1973, Renken 1983, Dale et al. 1997).

Grazing

Heavy or continuous grazing that reduces residual vegetation and litter is detrimental in both moist and dry parts of the species' breeding range (Owens and Myres 1973, Kantrud 1981, Anstey et al. 1995). Grazing systems that provide range in good (moderate vegetative and litter cover) condition provide suitable habitat (Anstey et al. 1995).

Rotational grazing systems in North Dakota seem to support higher numbers of Baird's sparrow than other (e.g., continuously grazed, short-duration) grazing systems (Messmer 1990). However, in Alberta, Baird's sparrow frequency of occurrence did not significantly differ between four grazing treatments: early-season tame (grazed from late April to mid-June), early-season native (grazed in early summer), deferred-grazed native (grazed after 15 July), and continuously grazed native (Prescott and Wagner 1996).

In denser, taller habitats (such as moist mixed-grass prairie), or during wet years, light to moderate grazing can improve habitat by providing shorter, sparser vegetation (Kantrud 1981, Renken 1983, Messmer 1990, Anstey et al. 1995).

Burning

Prescribed burns can improve Baird's sparrow habitat by reducing excess litter, decreasing shrub encroachment, and maintaining native grass communities. Baird's sparrows typically experience population declines during the first growing season post-fire (Pylypec 1991, Madden 1996, Johnson 1997), with populations recovering to or exceeding pre-fire levels in 1-5 year (Pylypec 1991, Winter 1994, Madden 1996, Johnson 1997). In North Dakota, Baird's sparrow densities were highest on areas burned four times during the previous 24 years (four-burn), compared to areas left idle (zero-burn) or burned twice during the same period (two-burn) (Winter 1999). They were absent from zero-burn areas and had lower numbers and larger territories in two-burn areas than in four-burn areas. Within four-burn areas, Baird's sparrows were absent from areas where there was no litter. Density of Baird's sparrows in two- and four-burn plots was positively related to maximum and mean vegetation height.

Mowing

Effects of mowing on Baird's sparrows depend on the timing, frequency, vegetation type (native vs. exotic), and amount of cover removed. Native hayland seems to be preferred to tame hayland (Kantrud 1981, De Smet and Conrad 1991 (in DeChant et al. 1998). Native hayland may be preferable to tame hayland because native grasslands usually are cut later in the season, and often only the densest portions of the field are cut, leaving some areas uncut each year. Baird's sparrows used hayland at least as often as pasture in North Dakota, Manitoba, and Saskatchewan (Kantrud 1981, Davis et al. 1996).

Cumulative Effects

Continued conversion of rangeland to croplands can be expected to occur on private lands across the planning area (Ostlie et al. 1997, USDA Forest Service 2000), with those occurring in North Dakota being especially relevent to the viability of Baird's sparrow. The absence of prescribed fire on private land is likely to continue, thereby reducing long-term nesting habitat quality for Baird's sparrow. Suitable idle grassland on private land is also uncommon.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. These agreements are long term and collectively cover virtually all lands suitable for grazing and for Baird's sparrow. Consequently, there is little or no land left idle. The extensive area under livestock grazing permits limits the opportunity for burning large areas because of the lack of alternative forage areas.

Conservation Measures and Mitigation

Keys to management are providing areas of native or tame grassland with moderately deep litter, controlling excessive grazing, and curtailing shrub encroachment. The U.S. Geological Survey (1998) developed several management recommendations for the conservation of the species. Those most relevant to the management practices proposed in this document are:

- Timing and type of management must be adjusted according to local and regional differences (soil types, climate, vegetation types) and annual precipitation (Madden 1996).

Conservation Measures and Mitigation, cont.

- Protect native grasslands that support breeding populations of Baird's sparrows, and establish additional suitable grasslands where possible (Winter 1994, Anstey et al. 1995). Protect both wet and dry habitats (e.g., wet meadows and mesic grasslands). Even if not used every year, these habitats may be essential as alternative breeding sites during drought or wet periods (Johnson 1996).
- Prevent encroachment of woody vegetation. Prescribed burning, mowing, and grazing can be used to maintain the early successional stage preferred by Baird's sparrows, including moderate litter and low shrub cover (Berkey et al. 1993, Winter 1994, Madden 1996, Johnson 1997).
- Encourage vegetative diversity within grasslands; scattered forbs, a mixture of grass heights, and patches of litter-covered ground are important to Baird's sparrows (Winter 1994).
- Provide large tracts of grassland, with at least enough area to support multiple Baird's sparrow territories (Berkey et al. 1993, Winter 1994). Large areas also may decrease rates of nest depredation and brown-headed cowbird parasitism (Johnson and Temple 1990, Davis and Sealy 1998).
- Burn large areas on a rotational basis, burning portions of the total area each year; burn small areas periodically (Renken 1983, Renken and Dinsmore 1987, Johnson 1997). Ensure that adjacent areas are burned in different years to create a variety of successional stages (Madden 1996, Johnson 1997). Treat small, isolated areas as part of a larger mosaic, ensuring a variety of successional stages (Renken 1983, Renken and Dinsmore 1987, Madden 1996, Johnson 1997). Use treatment intervals that approximate the historic fire return intervals for the region (i.e., 3-4 year intervals in tallgrass prairie, 4 year in sandhill prairie, 6 year in northern mixed-grass prairie, 5-10 year in shortgrass prairie, and up to 25 years in dry, western mixed-grass prairie) (Madden 1996).
- Whereas use of prescribed burns may be necessary to sustain Baird's sparrow populations in the eastern part of its range in the mixed-grass prairie, exercise caution in use of burning in the western portion of the breeding range where burning may not be necessary (Winter 1999).
- Delay mowing of hayfields until mid-July or August, which would allow many birds to raise at least one brood in years with normal breeding phenology; mowing should be delayed further if nesting is delayed by inclement spring weather (Dale et al. 1997). When mowing must be done during the breeding season, divide large fields, mowing only half each year, or mow individual fields every other year to provide refuge for fledglings (Dale et al. 1997).
- Prevent overgrazing in pastures utilized by Baird's sparrows. Graze using a deferred rotational system to ensure that only part of the range is grazed during the growing season (Messmer, 1990, Berkey et al. 1993). Use a complementary system when grazing cannot be restricted to winter, i.e., graze seeded range during the growing season, and native grasses in fall or winter. Grazing tame pastures in spring allows native pastures to be deferred, which improves habitat in the native pastures for Baird's sparrows (Prescott and Wagner 1996).

- When re-seeding public lands, or private pasture and haylands, use native grasses where possible to benefit grassland birds (Berkey et al. 1993, Dale et al. 1997).

Gillihan and Hutchings (2000) also provide management recommendations for this species and its habitat.

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

LMNG, GR/CRNG, SNG, FPNG, TBNG

- Modify livestock grazing practices as needed to reduce adverse impacts of drought to food and cover for prairie grouse and other wildlife (Standard).
- Delay mowing of grasslands until July 15 or later to protect ground-nesting birds, including their nests and young broods (Guideline).
- Manage for native forb abundance and diversity to provide foraging habitat for big game, grassland birds, and other grassland wildlife (Guideline).
- Manage for high structure habitat in large blocks to provide habitat for waterfowl, prairie grouse, and other ground-nesting birds (Guideline).
- Where technically and economically feasible, use genetically local native plant species in revegetation efforts (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

LMNG, GR/CRNG, SNG, FPNG, TBNG

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).
- Objectives are established for prescribe burning.

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

LMNG, GR/CRNG, SNG, FPNG, TBNG

- Monitor populations and habitat.
- Monitor the effectiveness of the suggested stocking rates in Appendix I in meeting desired vegetation composition and grassland structure levels.

Appendices

LMNG, GR/CRNG, SNG, FPNG, TBNG

- Appendix I provides suggested stocking rates for livestock grazing to provide quality habitat for management indicator species and other wildlife. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

LMNG, GR/CRNG, SNG, FPNG, TBNG

Baird's sparrows will be affected by livestock grazing, mowing, and prescribed burning. These activities are compatible with this species, as long as resulting vegetation and litter remain in suitable amounts. Because of the new direction on increasing prescribed burning, adding rest pastures, and increasing grassland structural diversity and composition, overall habitat quality is expected to increase as a result of implementing Alternative 3. Therefore, the biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." It's important to point out that the Little Missouri National Grassland is the largest tract of public land within the core breeding range of Baird's sparrow and will play a leading role in the species' conservation.

Outcome II is the selected risk assessments for this species on the Grand River, Cedar River, and Little Missouri National Grasslands, where the core breeding area overlaps these areas. A risk assessment was not completed for this species for the Thunder Basin and Fort Pierre National Grasslands where the species is an uncommon migrant through the area. It is acknowledged that some breeding may occur by this species on these areas but at an extremely low frequency.

SNG, FPNG

Determination is "no impact." The species presence on these national grasslands has not been confirmed and documented. However, management direction is provided for this species and potential habitat on these areas.

Fox Sparrow (*Passerella iliaca*)

Species Description

Fox sparrows are relatively large for a sparrow, being about 7 inches long. Their overall color ranges from gray to red to almost black, with all forms have the same general pattern of a monochromatic dorsum, and heavily streaked ventrum. This species is known for its complicated taxonomy. More than a dozen races have been described, with some researchers recommending that the fox sparrow be split into 3 or 4 separate species (Rising 1996). The status of the various subspecies in the planning area is unknown, but the bulk are attributable to the "red fox-sparrow" group in Nebraska and the Dakotas, and either the red or "slate-colored sparrow" group in Wyoming (Rising 1996).

The nesting season for fox sparrows is early April through early July. They build a bulky nest of twigs and grass, and place it in a low shrub or on the ground. Usually 3-5 eggs are laid, hatching in 12-14 days. The young fledge 9-10 days of age. Nest parasitism by brown-headed cowbirds is rare (Rising 1996).

Seeds form the bulk of the fox sparrows diet, although insects and other invertebrates are important food for nestlings.

Distribution and Status

Fox sparrows are widespread in North America, breeding from the Aleutians to Labrador, south through much of Canada, and extending into the Central Rocky Mountains. Wintering birds are found throughout much of the southern United States.

In the planning area, the fox sparrow is an uncommon to rare migrant. It is a very rare to irregular winter visitor. It does not nest in the planning area. During migration (typically April / early May and late September / October), the fox sparrow might be found in suitable habitat on any of the units, though it is most likely to be present on those with heavier forest cover, such as the Sheyenne National Grassland and portions of the Nebraska National Forest. Wintering in the planning area occurs in heavily forested areas, with the majority of birds being found in urban areas, many of them at bird feeders.

Table H-6 summarizes species occurrence and status in the planning area.

Organization Rankings

The fox sparrow is classified as a sensitive species in Region 2 of the Forest Service. It has been assigned a rank of G5 by the International Network of Natural Heritage programs and Conservation Data Centeres. A G5 rank is for taxa that have been demonstrated to be widespread, abundant, and secure globally.

Habitat

Fox sparrows use a variety of wooded habitats, particularly in migration. The most important habitat requirement seems to the presence of dense shrubby undergrowth (DeGraaf et al. 1991).

Conservation Planning

Statewide or regional habitat conservation strategies have not been prepared for this species.

Direct and Indirect Effects on NFS Lands

The most significant threat to habitat used during migration through the planning area is the potential for livestock grazing to degrade riparian or upland thickets.

Cumulative Effects

Impacts to fox sparrow migration habitats also occur on non-National Forest System lands in the planning area, and are largely due to grazing, agricultural development, dam construction, road construction, and urban sprawl (Ostlie et al. 1997, USDA Forest Service 2000).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

All Planning Units

- Manage for native forb abundance and diversity to provide foraging habitat for big game, grassland birds, and other grassland wildlife. (Guideline)
- Design and implement livestock grazing strategies to provide for thick and brushy understories and multi-story and multi-age structure in riparian habitats, wooded draws, and woody thickets, contingent on local site potential. (Guideline)
- Manage livestock grazing to maintain or improve riparian / woody draw areas. (Guideline)
- Implement management practices that will move at least 80% of riparian and wooded draw areas toward self-perpetuating tree and shrub regeneration (Objective).
- Conduct actions so that habitats are maintained or improved toward robust stream health (Standard).

Geographic Area Direction (Chapter 2)

All Planning Units

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).
- Objectives are established for prescribe burning.

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

All Planning Units

- Monitor populations and habitat.
- Monitor the extent that riparian area vegetation is regenerating.

Biological Determinations, Risk Assessments, and Rationale

FPNG, BGNG, ONG, NNF (PRRD), NNF (BRD), SRMNF, TBNG

The biological determination is “no impact.” The occurrence of this species on these planning units has not been confirmed and documented. However, management direction is provided for this species and potential habitat on these areas. If their occurrence was confirmed, the

biological determination would be "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Management activities on these planning units have minimal potential to affect fox sparrows as they migrate through these areas. Fox sparrows are also adaptable to a variety of habitats and habitat conditions. It's acknowledged that the condition of the understories and midstories of riparian areas, wooded draws and upland shrub thickets could influence use by this species, and management direction is provided to promote regeneration of shrubs.

A risk assessment was not conducted for this species due to its incidental, rare and transient nature on these planning units.

LMNG, GR/CRNG, SNG

Biological determinations are not made for this species on these areas since it is not listed as sensitive by Region 1 of the Forest Service. The conservation measures listed above are expected to enhance its habitat and/or protect the species and its habitat from possible adverse effects of Forest Service authorized activities and allocations.

Trumpeter Swan (*Cygnus buccinator*)

Bellrose (1978), Mitchell (1994), Biodiversity Legal Foundation (2000), and USDA Forest Service (1975 and 1995) were primary references consulted for this evaluation. Information on the NatureServe website for this species was also consulted. Harold Burgess from the Trumpeter Swan Society and retired U.S. Fish and Wildlife Service refuge manager and biologist graciously shared his lifetime of experience, knowledge, and unpublished data on the trumpeter swan.

Species Description

This is the largest species of North American waterfowl with wing spans and weight up to 8 feet and 30 pounds, respectively. It is one of two swan species native to this continent and is similar in appearance but larger than the tundra (whistling) swan. Fossils of the trumpeter swan date back to the Pleistocene. Generally, trumpeter swans in the northern Great Plains, considered part of the "Interior" population, do not migrate outside the region but instead remain yearlong in the vicinity of the LaCreek National Wildlife Refuge along the border of South Dakota and Nebraska or move only short distances to nest or winter. However, some movements outside this region by marked swans have been documented (Harold Burgess, unpublished data). The swan population in the northern plains and sandhills of Nebraska and South Dakota is now estimated to exceed 480 swans (Burgess, personal comm.).

Breeding pairs remain together year-round, and most swans do not nest until 4 years of age. Nest-building usually begins in late April to early May, sometimes before ice-melt. Both sexes may incubate. Clutch size is usually 5 to 7 eggs and 2 to 3 young per nest commonly survive to flight stage. Population growth for this species is slow because of delayed maturation (3 to 4 years), single annual brood, highly variable production and high winter mortality. Flooding of nests periodically occurs (Burgess 2000). Swans do not re-nest if their nest, eggs, or cygnets are destroyed.

Adult trumpeter swans require as much as 20 pounds of forage daily of submerged and emergent vegetation (Burgess 2000). Cygnets require high quality food with lots of protein, and in southwestern South Dakota, trumpeters with young seek out wetlands where alkali shrimp are plentiful.

Distribution and Status

With the exception of the Nebraska sandhills, the northern Great Plains planning area was of minor importance historically as breeding range for the trumpeter swan. However, it was important to migrating and wintering swans. The last historical observation of migrating swans in this area was in 1956 when a family of five swans was shot in northern Nebraska (U.S. Forest Service 1975).

Table H-6 summarizes the species occurrence in the planning area. Trumpeter swans nest on constructed ponds on and near the Buffalo Gap National Grassland and some winter on the Snake River just south of the Samuel R. McKelvie National Forest. Records of a nesting pair on Weta Pond on the Buffalo Gap National Grassland date back to 1964, and this pond continues to be used by nesting swans. Weta Pond is now cooperatively managed by the Forest Service and Ducks Unlimited as wetlands and waterfowl habitat. Swan pairs have also nested on at least 3 other ponds on private lands within the boundary of the Buffalo Gap National Grassland. It is unknown if trumpeter swans periodically utilize the ponds and wetlands habitats on the Samuel R. McKelvie National Forest. Although swans have been observed on Whitney Reservoir, none have been observed on the nearby Oglala National Grassland. The Oglala National Grassland has several ponds, including Meng Dam, that appear to be suitable habitat for nesting swans. Although trumpeter swans have also been observed on ponds near Upton and Oshoto, Wyoming, none have been observed on the nearby Thunder Basin National Grassland, and it's unlikely that suitable nesting habitat occurs on the national grassland.

Organization Rankings

TNC / NHP G4; FS Sensitive (R2)

This species was taken off the endangered species list in 1968.

Habitat

Trumpeter swans use constructed ponds on the Buffalo Gap National Grassland for nesting, brooding, foraging and loafing. They use the larger and shallower (< 4 feet) ponds and require large amounts of emergent cover (bulrush, cat-tail) through the nesting and brooding seasons. To facilitate flight from wetlands, swans need a low and clear flight path of at least 300 feet. Presence of muskrats usually indicates suitable swan habitat. They like to nest on islands or muskrat houses but will nest on shorelines if well concealed by emergent vegetation.

Arrowhead and smartweed are important foraging species during the summer along with alkali shrimp during brooding.

Conservation Planning

A conservation strategy has not been prepared for this species

Direct and Indirect Effects on NFS Lands

Livestock grazing that removes or reduces emergent vegetation around natural or constructed wetlands reduces or eliminates suitability for nesting.

Although nearby vehicle traffic seems to be tolerated, disturbance by people outside vehicles could discourage swan nesting or cause nest abandonment (Joslin and Youmans 1999).

Cumulative Effects

The effects listed above are likely occurring on adjoining lands in the planning area and in the vicinity of the individual planning units. Although there has been some drainage of wetlands on private lands in the western portion of the Nebraska sandhills, it is believed that destruction of natural wetlands has not significantly reduced potential nesting habitat for this species in this area. In fact, the nesting habitat on and near the Buffalo Gap National Grassland consists of constructed wetlands.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in the revised LRMPs (Alternative 3):

Unit-wide Direction (Chapter 1)

BGNG

- Design new water impoundments to provide new recreational fisheries and/or waterfowl and wetlands habitat (Guideline).
- Design and implement livestock grazing strategies to provide well-developed emergent vegetation on 30 to 50% of the wetlands (Guideline).
- In the water influence zone of wetlands, allow only those actions that maintain or improve long-term health (Standard).
- Locate new facilities outside wetland areas (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

- None

Management Area Direction (Chapter 3)

BGNG (MA 3.64)

- Approximately 1,160 acres including Weta Pond (nesting habitat) and Kadoka Lake (potential nesting habitat) is allocated to MA 3.64 that emphasizes management for wetlands and waterfowl.

Monitoring Direction (Chapter 4)

BGNG

- Continue monitoring populations and habitats.

Biological Determinations, Risk Assessments, and Rationale

BGNG

The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." The rationale for the biological determination is that the MA 3.64 allocation under Alternative 3 gives the existing nesting habitat (Weta Pond) and nearby potential nesting habitat (Kadoka Lake) additional protection. There's also additional direction to maintain well-developed emergent vegetation on many wetlands. Both of these areas are already managed cooperatively with Ducks Unlimited as wetlands and waterfowl habitat and have well-developed emergent zones.

Since this area is expansion habitat rather than historic breeding habitat, the risk assessment criteria are inappropriate, and a risk assessment was not done for this species. However, the management direction is still in place and this species remains a high priority for monitoring by the Forest Service and the U.S. Fish and Wildlife Service.

Black Tern (*Chlidonias niger*)

Species Description

The black tern is a small, light-bodied tern typically seen foraging in groups. In breeding plumage, the upper surface of the wings and slightly forked tail are dark gray, while the wing and tail undersides are whitish. The head, neck, breast, and belly are black. Juveniles and winter birds are dark gray on the upper surface, and whitish below, with a dark ear patch being the most distinctive feature.

In mid-May to early June, this species builds its nests on floating vegetation mats, old muskrat houses, old coot or grebe nests, floating driftwood, or on firm ground among marsh vegetation (Dunn and Agro 1995). Reproductive success is highly variable with adaptations to marsh nesting that includes re-nesting, low site tenacity and eggs suited to damp conditions. A typical clutch has 3 eggs, which are incubated by both parents for 20-22 days. The young remain on the nest for about 2 weeks, start to fly when they are approximately 3 weeks old, and are fully fledged by 4 weeks of age (Baicich and Harrison 1997).

Black terns feed primarily on insects, though some amphibians and small fish are also taken.

Distribution and Status

Black terns are widespread throughout the temperate areas of North America and Eurasia. In North America, black terns nest at prairie wetlands in southern Canada, and at prairie wetlands, taiga bogs, and marshes throughout most of the northcentral, central and western United States. Black terns leave Canada and the United States for winter.

Table H-6 summarizes species occurrence and status in the planning area. The black tern might occur as a migrant on any of the units except the Nebraska National Forest (Pine Ridge Ranger District). It is known to nest on the Sheyenne National Grassland, where it is typically present, late May through early September.

The black tern is relatively abundant, but declining rapidly (NatureServe 2000). Breeding Bird Survey (BBS) data, show an annual decline of 5.6% per year, for the period 1966-1989 (NatureServe 2000). Significant declines were noted in North Dakota, while sample sizes elsewhere in the planning area were insufficient (NatureServe 2000). The most likely causes of these declines are loss of marsh habitat, human disturbance at nesting sites, pesticide use, and problems along the migration route or in the winter range (NatureServe 2000, Dunn and Agro 1995)).

Organization Rankings

The black tern is classified as sensitive in Region 2 of the Forest Service. It has been assigned a G4 rank by the International Network of Natural Heritage programs and Conservation Data Centeres. A G4 rank is for taxa that are "apparently secure, uncommon but not rare, and usually widespread; possible cause for long-term concern". The black tern's rankings in the United States are similar (i.e. N4B). It was listed as a "moderate priority species" on the 1996 Partners in Flight Watchlist (Carter et al. 1996).

Habitat

Black terns are wetland obligates. During the breeding season, black terns in the planning area use relatively large marshes or marsh complexes (>50 acres) that contain extensive emergent vegetation adjacent to areas of open water (Dunn and Agro 1995). Smallest marsh reported to be used was approximately 13 acres. Suitable sites might be natural ponds, lakes, shallow river impoundments, or even stock ponds (Stewart 1975). They frequently nest on muskrat houses (Oakleaf et al. 1996). Nest success fluctuates widely from year to year, depending on weather and water levels. During migration, a variety of wetlands types, including rivers, lakes, reservoirs, and seacoasts are used.

The number and total acreage of the larger natural and constructed wetlands with open water on each of the planning units as determined by the National Wetlands Inventory are as follows:

Planning Unit	Greater Than 13 Acres	
	Number	Acres
LMNG	0	0
SNG	0	0
GR/CRNG	3	136
FPNG	1	16
BGNG	4	281
ONG	2	124
NNF(PPRD)	0	0
NNF (BRD)	0	0
SRMNF	1	292
TBNG	Not Available	

The data in the above table for the Samuel R. McKelvie National Forest does not include the large wetlands complexes associated with those portions of Merritt Reservoir located on the national forest.

Conservation Planning

The U.S. Fish and Wildlife Service (2000) prepared a status assessment and conservation plan for black tern.

Direct and Indirect Effects on NFS Lands

Livestock grazing could reduce the emergent vegetation around wetlands.

Lack of emergent vegetation management in some wetlands could result in the loss of open water habitat. Fire and livestock grazing can be used to help control emergents in some wetlands.

Any project that results in lowered water tables and the loss of wetland habitat could impact black terns and their habitat.

Cumulative Effects

Black terns may be affected by management activities in Wyoming, the Dakotas, and Nebraska on private, state, and other federal lands that impact wetland habitat quality. The loss of wetlands through drainage and filling (Ostlie et al. 1997, USDA Forest Service 2000, Johnson 1998, Abell et al. 2000, Pederson et al. 1989, Davis 2000, Natural Resource Conservation Service 1996) are undoubtedly important threats to the species through the planning area.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in the revised LRMPs (Alternative 3):

Unit-wide Direction (Chapter 1)

All Planning Units

- Manage land treatments to conserve site moisture and to protect long-term stream, wetland, and riparian health from damage by increased runoff (Standard).
- Allow only those actions next to perennial and intermittent streams, seeps, springs, lakes, and wetlands that maintain or improve long-term proper functioning of riparian ecosystem conditions (Standard).
- Design activities to protect and manage the riparian ecosystem. Maintain the integrity of the ecosystem, including quantity and quality of surface and ground water (Standard).
- Maintain and protect the hydrologic regime that supplies ground water to the wetlands so as to support species and habitats dependent on the existing water table and its natural variations (Standard).

- To provide protection for riparian areas, locate activities and facilities away from the water's edge or outside the riparian areas, woody draws, wetlands, and floodplains unless alternatives have been assessed and determined to be more environmentally damaging (Guideline).
- Do not deposit waste material below high water lines, in riparian areas, in areas immediately adjacent to riparian areas, or in natural drainage-ways (Guideline).
- Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function and meet regulations found in Section 404(b)(1) of the Clean Water Act (Standard).
- Design and implement livestock grazing strategies to provide well-developed emergent vegetation through the growing season on 30-50% of the wetlands distributed across watersheds and landscapes (Guideline).

FPNG, BGNG, ONG, NNF (BRD), SRMNF, TBNG

- Design and implement livestock grazing strategies to provide well-developed emergent vegetation on 30 to 50% of the wetlands (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

SNG

- Prohibit additional draining of the Sheyenne National Grassland (Standard).

Management Area Direction (Chapter 3)

BGNG (MA 3.64)

- Approximately 1,160 acres including Weta Pond and Kadoka Lake is allocated to MA 3.64 that emphasizes management for wetlands and waterfowl.

Monitoring Direction (Chapter 4)

FPNG, BGNG, ONG, NNF (BRD), SRMNF, TBNG

- Monitor populations and habitat.

All Planning Units (except NNF-PRRD)

- Monitor restoration of waterbodies that have been degraded by Forest Service permitted or management actions?

LMNG, GR/CRNG, SNG

- Monitor the extent that surface water, sub-surface flows, and aquifers have been protected from contamination by management actions.

Biological Determinations, Risk Assessments, and Rationale

FPNG, BGNG, ONG, NNF (BRD), SRMNF, TBNG

The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide". There is no wetlands drainage prescribed under Alternative 3, and direction is provided to maintain the health and vegetation around wetlands. Under the prescribed burning objectives, fire could be used to help maintain open water within some of the wetlands that have a tendency to become choked with emergent vegetation.

Much of the potential and suitable nesting habitat on these units is constructed wetlands (small impoundments), and historic breeding habitat was limited or nonexistent. Therefore, the risk assessment criteria are inappropriate, and a risk assessment was not done for this species.

ONG, NNF (BRD), SRMNF

The biological determination is “no impact.” The species presence on these areas has not been confirmed and documented. However, management direction is provided for wetlands habitat on these areas. If the species occurrence was confirmed, the biological determination would be "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide".

LMNG, GR/CRNG, SNG

Biological determinations are not made for this species on these areas since it is not listed as sensitive by Region 1 of the Forest Service. The conservation measures listed above are expected to protect its habitat from possible adverse effects of Forest Service authorized activities and allocations.

Black-backed Woodpecker (*Picoides arcticus*)

Species Description

This robin-sized woodpecker resembles the slightly smaller three-toed woodpecker in both plumage and behavior. The black-backed woodpecker has a solid black back where the back of the three-toed woodpeckers back is barred black and white. The male of the black-backed woodpecker has a yellow crown, where the female’s crown is solid black.

The breeding season for this species begins with increased territorial activity in April, with most nesting activity occurring in May. Nests are placed in tree cavities. The black-backed woodpecker usually lays 4-5 eggs, which are incubated by both parents for 13 days. The young fledge at about 24 days of age (Baicich and Harrison 1997).

Wood-boring beetles, such as those in the Cerambycidae and Buprestridae families, are the primary food for the black-backed woodpecker. Insects are retrieved from dead or live trees by scaling (Bull et al. 1986). They also use pecking and gleaning strategies to feed.

Distribution and Status

This species ranges from Alaska, across Canada to Newfoundland, and south to the northern United States, extending into the Southern Rocky Mountains.

Table H-6 summarizes species occurrence and status in the planning area. The black-backed woodpecker may possibly occur on the Thunder Basin National Grassland, and nesting is also possible (Wyoming Game and Fish Department 1997). This species has occurred as a vagrant on the Dakota Prairie Grasslands (Denbigh Experimental Forest).

The black-backed woodpecker has likely undergone significant declines during the 20th century, due to fire suppression and logging. Little information is actually known however, since Breeding Bird Surveys (BBS) and Christmas Bird Counts (CBC) do not adequately monitor this species. Based on the limited BBS data that is available, the species showed generally stable trends 1966-1996, with statistically non-significant declines in recent years (i.e. 1980-1996) (NatureServe 2000).

Organization Rankings

The black-backed woodpecker is classified as a sensitive species in Regions 1 and 2 of the Forest Service. The International Network of Natural Heritage programs and Conservation Data Centeres has assigned it a global ranking of G5, meaning "secure." The ranking in the United States (N4), indicates "apparently secure." Partners In Flight has identified the black-backed woodpecker as a "High Priority" species in Wyoming.

Habitat

Black-backed woodpeckers are habitat specialists. They are permanent residents of suitable woodlands which include mature and over-mature ponderosa pine, lodgepole pine, larch, Douglas fir, and spruce stands. This nomadic bird appears in large concentrations of burned or old forests where there are lots of dead or dying trees.

The black-backed nests in a tree cavity, which it excavates itself. Nests have been found in lodgepole, ponderosa pine and western larch trees with heart rot in Oregon (Bull 1986, Goggan et al.) and Douglas fir, western larch, and ponderosa pine in Montana (Harris 1982). On the average, nest trees are greater than 20 inches dbh and have been dead less than 5 years.

A more detailed account of their habitat is presented in the biological assessment and evaluation for the Black Hills National Forest Land and Resource Management Plan (USDA Forest Service 1996).

There are approximately 10,000 acres of ponderosa pine forests on the Thunder Basin National Grassland, respectively. Because of a lack of forest inventories, the amount of this area that is suitable for this species (primarily structural stages 4a, 4b and 5) is unknown, but it's reasonably safe to assume that most of this acreage is currently unsuitable or marginal for black-backed woodpeckers.

Conservation Planning

State-wide or regional habitat conservation strategies have not been prepared for this species.

Direct and Indirect Effects on NFS Lands

It is likely that fire suppression is resulting in incremental changes in forest stocking and structure and reduced levels of habitat suitability for this species.

Fuelwood cutting that reduces the number of snags would result in reduced levels of habitat suitability for this species.

Cumulative Effects

All of the activities listed above under direct and indirect effects are likely occurring on private lands throughout the forested areas on and in the vicinity of the Thunder Basin National Grassland.

Interrelated and Interdependent Actions

Determining ponderosa pine forests to be within the suitable timber base can result in pre-commercial thinning and commercial timber sales.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

TBNG

- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

TBNG

- During vegetation management projects, use methods that emphasize development of structural stages 4 and 5. The longterm objective is to have approximately 40% of the forest cover in structural stage 4 and 20% in structural stage 5 (Objective).
- Fire will be reintroduced as determined by project specific resource needs (Objective).
- Management activities should replicate natural biological processes and vegetative patterns and patch sizes (Guideline).
- During vegetation management projects, maintain an average of 4 snags per forested acre (Standard).
- Retain all soft snags unless they are a safety hazard (Guideline).
- When necessary to meet the minimum snag standard, create snags from live tree replacement (Guideline).

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

NNF (PRRD), TBNG

- Monitor populations and habitat.

Biological Determinations, Risk Assessments, and Rationale

TBNG

The biological determination is “no impact.” The species presence on this area has not been confirmed and documented. However, management direction is provided for this species and its habitat. If the species occurrence was confirmed, the biological determination would be "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide".

Lewis' Woodpecker (*Melanerpes lewis*)

Species Description

The Lewis’ woodpecker is approximately 11 inches long, with a greenish-black head and back, which contrasts with the pink-red belly and gray breast and collar.

This species’ breeding season begins in mid-April to late May. It nests in natural cavities and cavities excavated by other woodpeckers, as well as digging its own. A typical clutch is 6-7 eggs, which are incubated by both parents for 12-14 days. The young remain in the nest for 31 days and are tended by the parent for at least 10 days post-fledgling (Baicich and Harrison 1997).

Lewis’ woodpeckers eat insects during the spring and summer, and are often seen catching flying insects in mid-air. During fall, fruits and berries are preferred, while wintering birds eat acorns and other mast (DeGraaf et al. 1991).

Distribution and Status

Lewis’ woodpeckers breed from southern British Columbia to southwestern South Dakota, and northwestern Nebraska south to California. Populations in the northern half of the breeding range move southward for winter, while other populations may be resident. The species winters from northern Oregon, southern Idaho, central Colorado, and south-central Nebraska into northern Mexico (DeGraaf et al. 1991).

Table H-6 summarizes species occurrence and status in the planning area. Lewis’ woodpeckers are known to occur on the Thunder Basin and Oglala National Grasslands and on the Nebraska National Forest (Pine Ridge Ranger District).

Based on Breeding Bird Surveys, Lewis’ woodpecker populations have declined by more than 60% between the 1960s and mid-1990s (NatureServe 2000). The most likely causes are due to habitat loss from timber harvest, fire suppression, and riparian grazing by livestock.

Organization Rankings

The Lewis’ woodpecker is classified as a sensitive species in Region 2 of the Forest Service. It has a global conservation rank of G5. It is on Partners in Flight’s Watch List for Wyoming and South Dakota, as well as being on their national list.

Habitat

The Lewis' woodpecker occurs in open country with scattered trees. Favored habitats include open, park-like ponderosa pine savannahs, burned-over conifer stands, pinyon-juniper stands, oak savannah, and riparian areas with numerous large cottonwoods (DeGraaf et al. 1991). Preferred areas have understories of grasses and shrub that support abundant insect prey populations. The presence of suitable nest trees is an important habitat requirement.

A more detailed account of their habitat is presented in the biological assessment and evaluation for the Black Hills National Forest Land and Resource Management Plan (USDA Forest Service 1996).

There are approximately 22,000 and 10,000 acres of ponderosa pine forests on the Nebraska National Forest (Pine Ridge Ranger District) and Thunder Basin National Grassland, respectively. Because of a lack of current forest inventories, the amount of this area that is suitable for this species (structural stages 4a, 4b and 5) is unknown. In addition to the forested acres listed above on the Nebraska National Forest, there are over 10,000 acres of additional ponderosa pine forests that have been intensively burned over the last 3 decades. These areas provided suitable short-term habitat for Lewis' woodpecker.

Conservation Planning

State-wide or regional habitat conservation strategies have not been developed for Lewis' woodpecker in the planning area.

Direct and Indirect Effects on NFS Lands

Fire suppression in ponderosa pine woodlands can result in long-term incremental decline in habitat suitability for this species. Prescribed burns can help maintain ponderosa pine savannah and preferred habitat for Lewis' woodpecker. Lack of silvicultural treatments to maintain ponderosa pine savannah can result in long-term incremental decline in habitat suitability for the species.

Riparian grazing can decrease the ability of cottonwoods to regenerate, decreasing long-term habitat quality for this woodpecker.

Cumulative Effects

Timber harvest is occurring on large acreages of private land within the Nebraska pine ridge area. It's estimated that timber sales have occurred on approximately 42,000 acres of forested private lands since the early 1990s (John Overstreet, personal comm.). This acreage includes inaccessible pine stands. The primary silvicultural harvest method used on private lands is to selectively cut all merchantable mature trees in a ponderosa pine stand. Assuming snags and nest trees are retained, this activity is probably having a beneficial affect on this species.

Fire suppression will also continue on private lands, and this will perpetuate the continuing development of thick ponderosa pine stands in inaccessible areas (Ostlie et al. 1997, USDA Forest Service 2000). This will temporarily reduce the suitability of these areas for this species until these areas eventually burn.

Competition with nesting Europeon starlings may be another cumulative effect impacting Lewis' woodpecker populations.

Interrelated and Interdependent Actions

Determining and classifying timber lands as suitable for commercial harvests can result in additional acres of ponderosa pine thinning and improved habitat conditions for the Lewis' woodpecker, assuming snags and nest trees are retained.

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in the revised LRMPs (Alternative 3):

Unit-wide Direction (Chapter 1)

BGNG, ONG, NNF (PRRD), TBNG

- Design and implement livestock grazing strategies to provide for thick and brushy understories and multi-story and multi-age structure in riparian habitats, wooded draws, and woody thickets, contingent on local site potential (Guideline).
- Manage livestock grazing to maintain or improve riparian / woody draw areas (Guideline).
- Implement management practices that will move at least 80% of riparian and wooded draw areas toward self-perpetuating tree and shrub regeneration (Objective).

BGNG, ONG, NNF (PRRD), TBNG, cont.

- Conduct actions so that habitats are maintained or improved toward robust stream health (Standard).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

NNF (PRRD)

- Use silvicultural methods to emphasize development of structural stages 4a and 5 (Objective).
- Manage for 40%and 20%of the forest cover to be in structural stages 4 and 5 over the long-term (Objective).
- Use prescribed burning to achieve desired vegetation conditions including ponderosa pine savannah (Objective)
- Design vegetative treatments to maintain an average of 4 snags per forested acre (Standard).
- Retain all soft snags unless they are a safety hazard (Guideline).
- When necessary to meet the minimum snag standard, create snags from live tree replacement (Guideline).

TBNG

- During vegetation management projects, use methods that emphasize development of structural stages 4 and 5. The longterm objective is to have approximately 40% of the forest cover in structural stage 4 and 20% in structural stage 5 (Objective).
- Fire will be reintroduced as determined by project specific resource needs (Objective).
- Management activities should replicate natural biological processes and vegetative patterns and patch sizes (Guideline).
- During vegetation management projects, maintain an average of 4 snags per forested acre (Standard).
- Retain all soft snags unless they are a safety hazard (Guideline).
- When necessary to meet the minimum snag standard, create snags from live tree replacement (Guideline).

Management Area Direction (Chapter 3)

TBNG

- The 5,980-acre Cheyenne River Zoological Special Interest Area (MA 2.1) provides a management emphasis on riparian habitats. This area may provide potential habitat for this species.

Monitoring Direction (Chapter 4)

BGNG, ONG, NNF (PRRD), TBNG

- Monitor populations and habitat.
- Monitor the extent that riparian area vegetation is regenerating.

Biological Determinations, Risk Assessments, and Rationale

TBNG, NNF (PRRD), ONG

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Management activities that promote more ponderosa pine stands with silvicultural techniques such as thinning or prescribed fire will benefit Lewis' woodpeckers. Management direction is also in place to promote regeneration of cottonwood riparian woodlands.

Outcome II is selected as the risk assessment for this species on these areas. Habitat is of sufficient quality, distribution, and abundance to allow the species to maintain populations. There is no need for reintroductions or transplants.

BGNG

The biological determination is "no impact." The species presence on this area has not been confirmed and documented. However, management direction is provided for riparian regeneration on these areas. If the species occurrence was confirmed, the biological determination would be "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Fringe-tailed myotis (*Myotis thysanodes pahasapensis*)

Species Description

The fringe-tailed myotis is distinguished from other *Myotis* by the conspicuous fringe of hairs located along the back edge of the interfemoral membrane (Aston and Dowd 1991). This fringe is actually distinct clumps of up to 15 hairs each (Lechleitner 1969). *M. thysanodes* is 80-95 mm (3 1/8-3 ¾ inches) in length and has a wingspread of 265-300 mm (10.4-11.8 inches). Ashton and Dowd (1991) described the species as having reddish to dark brown fur on its back and paler underneath. The ears are large, and when laid forward, extend 3-5 mm beyond the nose.

The subspecies, *M. t. pahasapensis* represents a geographically isolated population, and is the taxa found in western Nebraska, the Black Hills and Badlands of South Dakota, and adjacent areas of Wyoming. It is distinguished by its larger ears, shorter forearms, and smaller, narrower skull (Ashton and Dowd 1991, Jones, Jr. et al. 1983), and is the focus of this account.

Fringe-tailed myotis breed in the fall. The sperm is stored in the uterus of the female over the winter. In spring, ovulation, fertilization and implantation takes place. They have one young per year, in June or July. The period of gestation is 59-60 days, which takes place in maternity colonies in caves, mines, or buildings (Ashton and Dowd 1991). In western South Dakota, pregnant females have been observed in June. Lactating females were reported in late July and August (Czaplewski et al.1983). This species is generally solitary, but may be found in clusters with other species at day roosts. Females form maternity colonies that may number several hundred mothers and young (Jones, Jr. et al. 1983).

The fringe-tailed myotis feeds largely on arthropods such as moths and beetles. They emerge to feed about 2 hours after sunset, and forage over and along water courses, or above the canopy of shrub lands and woodlands (Colorado Division Wildlife 1984).

Distribution and Status

Myotis thysanodes ranges from British Columbia through the western states, skirting much of Wyoming, to southern Mexico.

Table H-6 summarizes species occurrence and status in the planning area. It is known to occur on the Buffalo Gap, Oglala, and Thunder Basin National Grasslands and on the Nebraska National Forest (PRRD).

Specific population trend information is not available (NatureServe 2000). Indications are that the species is stable or declining.

Organization Rankings

The fringe-tailed myotis is classified as a sensitive species in Region 2 of the Forest Service, and has a global conservation rank of G4. The fringe-tailed myotis is listed as a priority species in Wyoming. It has a Natural Heritage status as critically imperiled in Nebraska and Wyoming, and rare and endemic in South Dakota.

Habitat

Myotis thysanodes inhabits mid-elevation grasslands, deserts, and oak and pinyon woodlands. They have also been detected in high elevation spruce-fir forests (Finch 1992).

In Nebraska, the subspecies, *M. t. pahasapensis*, has been found in riparian deciduous growth along creeks, below pine-clad buttes, and near spring fed ravines and ponds (Czaplewski et al. 1979). In the Black Hills of South Dakota, it has been observed roosting during the day in caves, mines, and buildings (Ashton and Dowd 1991).

On the Pine Ridge District, the species occurs in riparian habitat along the Pine Ridge from Bordeaux Creek, west to Highway 2. They roost in buildings, rock crevices, and possibly large cottonwood trees.

Conservation Planning

There is no conservation strategy for this subspecies.

Direct and Indirect Effects on NFS Lands

Human disturbance at roosts sites, cave destruction, and habitat loss are the main factors affecting this bat (Finch 1992).

Insecticide poisoning can also have a detrimental effect on the fringed-tailed myotis (Ashton and Dowd 1991).

Druecker (personal communication) believes that current grazing practices in many areas are detrimental to bat habitat. Bats feed on insects over calm water pools. The cattle tend to congregate along riparian habitat, resulting in trampling of the adjacent vegetation. This loss of vegetation leads to a decrease in cottonwood regeneration and growth. On the Pine Ridge Ranger District, Druecker believes that large cottonwoods play an important role in providing roosts for many bat species including the fringe-tailed myotis. On the Pine Ridge, the majority of cottonwoods are mature, with very little evidence of regeneration due primarily to livestock grazing.

Cumulative Effects

On non-National Forest System lands in the planning area, riparian vegetation loss continues, to the detriment of this species (Ostlie et al. 1997). It should be noted however, that since the time of European settlement the extent of riparian forest and other vegetation is believed to have increased dramatically in many areas. In addition, shelterbelts and other structures on the Great Plains must have played a role in increasing fringe-tailed myotis habitat. Other likely cumulative effects include disturbance to roosting bats by cave recreationists, and loss of habitat due to collapsing mines.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

BGNG, ONG, NNF (PRRD), TBNG

- Protect all known day roost areas and wintering sites used by bats.
- Numerous standards and guidelines provide direction for managing for riparian and wetlands heath and vegetation regeneration.
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

- None

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

BGNG, ONG, NNF (PRRD), TBNG

- Monitor populations and habitat.

Biological Determinations, Risk Assessment, and Rationale

BGPN, ONG, NNF (PRD), TBNG

Management activities will have limited impact on this species. Significant human disturbance at roost sites and cave destruction are not prescribed or expected. Riparian management direction that promotes regeneration and health of riparian and wetland habitats should benefit the species. The biological determination is:"may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability range wide."

Outcome II is selected as the risk assessment for this species on these areas. Because no major habitat losses are expected and since riparian conditions are expected to improve, populations should be fairly secure in these areas.

California Bighorn Sheep (*Ovis canadensis californiana*)

Species Description

Bighorn sheep are relatively small-sized members of the Bovidae, which includes bison, mountain goats, muskox, and domestic cattle, among others. The bighorn is about 3 feet high at the shoulder, and weighs 125-275 (males) or 75-150 (females) pounds. Its overall color is brownish or grayish-brown, with a creamy white sump. The head is adorned with massive horns, which are particularly large in the male (Burt and Grossenheider 1976).

The subspecies, *O. c. audubonì*, originally occupied the northern plains, including the eastern portions of Wyoming and Montana and western North Dakota, South Dakota and Nebraska (Jones et al. 1983). The last known survivors in western North Dakota, Nebraska, and South Dakota were recorded in 1905, 1918 and 1924, respectively (Jones et al. 1983). The last known Audubon's was shot in eastern Pennington County, South Dakota, not too far from the present day Buffalo Gap National Grassland. In addition to hunting, disease associated with domestic

and feral livestock probably also contributed to the demise of this subspecies (Knue 1991). The subspecies, *O. c. californiana* and *canadensis*, have been reintroduced in an effort to return bighorn sheep to the badlands and grasslands of this region. It is important to note that some taxonomists believe the evidence to recognize the Audubon's bighorn as a subspecies, is very weak (Jones et al. 1983). The focus of this account is *O. c. californiana*.

Bighorns are highly social animals that usually separate into ram bands, and nursery bands comprised of ewes, lambs, and subadults. After 2 years of age, young rams leave the nursery herd to join a ram band. The bands are organized into social hierarchies where rank is determined by strength and horn size, which are related to age. Adult bighorns reach sexual maturity at about 2-3 years of age. Breeding season occurs in November and December when rams aggressively compete for females. Bighorns are promiscuous, but most of the breeding is performed by dominant rams. Lambing occurs in May and June.

Distribution and Status

Bighorn sheep can be found in suitable montane habitat from southwestern Canada south through the Rocky Mountains, Sierra Nevada, and desert ranges of the southwestern United States, and into Mexico (NatureServe 2000).

Table H-6 summarizes species occurrence and status in the planning area. Distribution of California bighorn sheep on NFS lands in the planning area is limited to the Little Missouri National Grassland. In 1956, 18 California bighorn sheep from British Columbia were reintroduced to the North Dakota badlands along Magpie Creek. A number of additional transplants have occurred since then (Jensen 1992). The most recent population estimate for the North Dakota badlands is approximately 150 sheep. A different subspecies, the Rocky Mountain bighorn sheep (*O. c. nelsoni*), occur on portions of the Buffalo Gap National Grassland and the Nebraska National Forest (Pine Ridge Ranger District).

Four potential bighorn sheep metapopulations that utilize substantial portions of the Little Missouri National Grassland have been identified by the North Dakota Game and Fish Department (Jensen 1992). For long-term viability (>100 years), at least 125 bighorns are needed in each of these metapopulations (Smith et al. 1991, Jensen 1992). None of the four metapopulations is currently at this level. Until recently, the Southern Badlands metapopulation came close to meeting this guideline but die-offs in the late 1990s, most likely from Pasteurellosis, have almost eliminated this herd (Stillings 2000). Additional protected areas (MA 3.51) allocated in the revised Land and Resource Management Plan and supplemental releases will be necessary.

The North Dakota Game and Fish Department in cooperation with the Forest Service has identified the additional portions of the Little Missouri National Grassland needed to help increase the individual metapopulations and overall population on the National Grassland and adjoining areas. It's estimated that the total sheep population could increase to over 400 animals with additional releases and protected habitat on the national grassland.

Organization Rankings

The California bighorn sheep has sensitive species status in Region 1 of the Forest Service. This species has been assigned a rank of G4/G5 by the International Network of Natural Heritage programs and Conservation Data Centeres. A G4 indicates species that are apparently secure, while a G5 rank is for taxa that are demonstrably widespread, abundant, and secure globally. The ranking in the United States is similar (N4).

Habitat

Bighorn sheep are well-adapted to a wide variety of habitats. In the planning area, they use badlands and other steep grassland topography as their primary escape cover. Sheep in North Dakota are primarily browsers with buffaloberry being an important diet component (Jones et al. 1983). They also feed on grasses, sedges, and forbs.

Conservation Planning

Jensen (1992) presents a conservation strategy for *O. c. californiana* on the Little Missouri National Grassland and vicinity.

Direct and Indirect Effects on NFS Lands

Bighorn sheep are sensitive to disturbance (Feist 1997, Knue 1988, Joslin and Youmans 1999, McCarthy et al. 1998). Management activities that displace or disturb bighorn, especially when lambing, can negatively affect reproduction. Sayre (1996) concluded that the most significant disturbance to bighorns in North Dakota was the vehicle traffic and activity associated with oil well maintenance.

Bighorn sheep are susceptible to disease spread by domestic sheep and goats.

Fences, if improperly constructed, could interfere with bighorn movements and could also result in direct mortality.

Fire suppression can result in increased juniper cover that reduces habitat suitability for bighorns.

Livestock grazing could either enhance or degrade forage availability and quality for bighorn sheep, depending primarily on the timing and intensity of the grazing.

Cumulative Effects

Oil and gas development activities are occurring on adjoining private lands within the administrative boundary of the Little Missouri National Grassland. Coyote predation on lambs may be an important additional factor in low recruitment. The North Dakota Game and Fish Department plans to transplant bighorns in the Little Missouri National Grassland to bolster the viability of the species in this area.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development and additional roads, traffic and pipelines.

Conservation Measures and Mitigation

Feist (1997) recommended the following for bighorn sheep on the Little Missouri National Grassland:

- Encourage augmentation of the existing herds.
- Identify high use areas, paying particular attention to lambing areas.
- Prevent human activity mid-April to early July near escape terrain used by ewes and lambs.
- Minimize human disturbance on bighorn range throughout the year.
- Keep new roads to a minimum in bighorn sheep habitat.
- Remove woody vegetation that reduces bighorn sheep habitat quality.

Sayre (1996) suggested:

- Schedule vehicle disturbance to coincide with periods when the sheep are already on escape terrain.
- Follow a regular schedule of oil well maintenance so that bighorn sheep are accustomed to disturbance at particular times of the day.
- Clear encroaching juniper from bighorn sheep habitat.
- Document bighorn sheep distribution.
- Limit oil well construction and maintenance during the lambing season.

The following conservation measures are presented as management direction in Alternative 3 in the revised LRMPs:

Unit-wide Direction (Chapter 1)

LMNG

- Design and build new structures, including fences, to reduce hazards to big game and to allow big game movement throughout the year (Guideline).
- Protect bighorn sheep lambing areas from activities and land use disturbances if adverse impacts to the survival or reproductive success of bighorn sheep or abandonment of the lambing area are likely (Standard).
- Within 5 years, develop prescribed fire plans in support of habitat improvement for bighorn sheep (Objective).
- Do not authorize domestic sheep grazing within ten miles of bighorn sheep management areas (MA 3.51 and 3.51a) (Guideline).

- Domestic sheep and goats may be permitted as part of an integrated pest management control program if they do not conflict with bighorn sheep management objectives (Guideline).
- Discourage recreational activities in bighorn sheep lambing areas, April 1 through June 15 (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Management Area Direction (Chapter 3)

LMNG (MA 3.51 and 3.51a)

- Approximately 55,130 acres are allocated to MA 3.51 and 3.51a that emphasize bighorn sheep restoration.
- Resolve conflicts in favor of maintaining bighorn sheep habitat (Standard).
- Implement habitat enhancement projects that improve sheep foraging habitat and provide connectivity of foraging areas with escape terrain (Guideline).
- Allow new oil and gas leasing, however no ground-disturbing activities are permitted (Standard).
- As funding allows, identify and implement surface and minerals estate land exchanges that contribute to bighorn sheep management objectives (Guideline).
- Do not convert existing livestock allotments to domestic sheep allotments in or adjoining this management area (Standard).
- Limit livestock forage allocation based on bighorn sheep needs (Guideline).
- Domestic sheep may be permitted as part of an integrated pest management control program if the do not conflict with bighorn sheep management objectives (Guideline).
- Snowmobile use is prohibited in the management area (Standard).
- Restrict travel to protect sheep concentrations during lambing, breeding, and winter use (Guideline).
- Allow construction of new utility corridors only if they do not degrade the characteristics for which the area was designated (Standard).
- Prohibit construction of new travel routes across bighorn sheep habitat. However, honor valid existing rights such as oil and gas leases (Guideline).
- Leasing of federal mineral parcels will not occur until there is development of a well on an adjacent spacing unit or an access road is built across the management area to access existing rights. Once development on an adjacent spacing unit or adjacent non-federal mineral estate occurs, the adjacent federal minerals may be leased using Controlled Surface Use stipulations if no additional significant adverse impacts to bighorn sheep would occur. If the adjacent federal minerals parcel is leased, subsequent surface operations may be modified or moved to minimize the additional impacts on bighorn sheep habitat. (Standard - MA 3.51a only)

Monitoring Direction (Chapter 4)

- Monitor populations and habitat.

Biological Determinations, Risk Assessments, and Rationale

LMNG

The biological determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Under this alternative, areas used by bighorn sheep will be designated as Management Area 3.51 or 3.51a (some of these acres are incorporated into other management areas such as 1.2a). This designation is designed specifically to highlight bighorn sheep and their habitat, and represents a substantial commitment to an intensive bighorn sheep restoration and management program. Areas designated as 3.51 or 3.51a were identified by referencing bighorn sheep distribution maps and Jensen's 1992 report, and consulting with the North Dakota Game and Fish Department (2000) on anticipated reintroductions. As an additional mitigation measure, any bighorn sheep found lambing outside of management area 3.51 or 3.51a would also be protected (see Grassland Wide Direction, Section F., Bighorn Sheep).

Although bighorn sheep would benefit from the management direction outlined above, an overall determination of "may adversely affect" is still warranted. Impacts will still result from an overall increase in human disturbance associated primarily with oil and gas development and recreation (Dan Svingen, Grassland Biologist, prof. opin.).

As discussed above, bighorn sheep populations on the Little Missouri National Grasslands will need augmentation (supplemental stocking). Such efforts have been successful with the species elsewhere. Based on these considerations, outcome V is selected as the risk assessment.

Evaluations for Plant Guilds

Eastern Prairie Boggy Wetlands Guild

Plant species in this guild include:

Bog willow	Buckbean
Crested shield fern	Delicate sedge
Labrador bedstraw	Loesel's twayblade
Marsh bellflower	Marsh fern
Marsh horsetail	Meadow horsetail
Sensitive fern	Shining flatsedge
Showy lady's slipper	Slender cottongrass
Spinulose woodfern	Umbrella flatsedge

Table H-6 summarizes species occurrence and status in the planning area. Each of these species is classified as sensitive by Region 1 of the Forest Service.

Guild Description

This plant group includes plant species found in habitats associated with bogs, calcareous fens, springs, boggy woodlands, and the green ash / basswood deciduous hardwoods found predominately within the tallgrass prairie regions of the planning area. All of the species have

known occurrences on the Sheyenne National Grassland and several species are known or suspected of occurring on the Samuel R. McKelvie and Nebraska National Forests in the Nebraska sandhills. This group contains the largest number of Region 1 sensitive plant species with 16 of the 42 species represented.

Most of the currently known populations of these species are found along the Sheyenne River corridor in eastern North Dakota. Many of the species are hydrophylic and wetland obligate species with habitats that are dependent upon the interaction of hydrologic regimes within the riverine and upland landscape (ND Parks and Recreation Dept. 1990, Seiler 1973, North Dakota Natural Heritage database 2000). In addition to the boggy seeps found along this drainage, this plant group includes the river gallery forests of elm and basswood. The majority of the species in this plant group are primarily restricted to a narrow range of habitats, i.e. they are species with either a narrow range or mid-range of versatility (USDA Forest Service 2000). The list includes one shrub, eight forbs, several sedges, and numerous fern species.

Within the Northern Great Plains planning area, the habitat components captured by this plant group are uncommon and occupy a very small percentage of the total land base (Seiler 1973, ND Parks and Recreation Dept. 1990). The large complex of bogs/fens, flowing springs, and boggy woodlands on the Sheyenne National Grassland in eastern North Dakota are a landscape feature resulting from upland drainage patterns into the Sheyenne River (Seiler 1973). Wetlands that provide habitat on other portions of the planning area may differ in habitat, soils, and hydrologic regime from those described for the Sheyenne National Grassland, however these other habitats share the common feature of containing perennially wet soils within the tallgrass prairie.

Slender cottongrass (*Eriophorum gracile*)

The distribution of slender cottongrass is circumboreal, south in North America to Maryland, Indiana, Iowa, Nebraska, Colorado, Idaho, and California (NatureServe 2000). Global rank of slender cottongrass is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Within the planning area, slender cottongrass is known from very limited occurrences in Nebraska and South Dakota, and two populations in North Dakota (North Dakota Natural Heritage database 2000; Larson 1993).

Of the two populations in North Dakota, one of the populations is very small consisting of 10-20 individuals. The public land portion of one of the populations is fenced and the other population is on private land.

Habitat includes open fens, seeps, and springs (Heidel et al. 1992, North Dakota Natural Heritage database 2000). Habitat is dependent upon maintenance of the hydrologic regime.

Shining flatsedge (*Cyperus bipartitus Torr.*)

This is a widely distributed species, with a range encompassing much of the United States, although it is peripheral within the planning area. The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). In the planning area, this species is rare in North Dakota and Wyoming and has been reported from South Dakota and Nebraska (NatureServe 2000).

Shining flatsedge is known from seven populations in North Dakota, several of them either historical records or older records not recently confirmed (North Dakota Natural Heritage database 2000). The populations range in size from two individuals to locally abundant. Ownership is mixed between the U.S. Forest Service, private, and Nature Conservancy lands. The species has limited distribution in South Dakota and is more widespread in Nebraska (Larson 1993).

Habitat includes wet sandy areas, especially shores of ponds and streams (Seiler 1973, Barker et al. 1977). Habitat is dependent upon maintenance of the hydrologic regime.

Marsh horsetail (*Equisetum palustre*)

The distribution of this species is circumboreal, south in North America to Ohio, Nebraska, and California. The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Within the planning area, marsh horsetail is known from nine populations in North Dakota, including historical records and several records not recently confirmed. It is also recorded from South Dakota and Nebraska. In the northern Great Plains, it occurs on the periphery of its natural range (NatureServe 2000).

North Dakota populations range in size from 20 individuals to 500 individuals (North Dakota Natural Heritage database 2000). Ownership includes Forest Service System lands, private, state, and Nature Conservancy lands. Some of the current populations are impacted by grazing, streambank erosion, and alteration of hydrologic regimes (North Dakota Natural Heritage database 2000). Habitat threats include livestock grazing, invasive plant species, and alteration of the hydrologic regime.

Habitat includes wetland edges in oxbow swamps along the Sheyenne River, as well as occurring on moist sandy streambanks and boggy areas (Larson 1979, Seiler 1973, Barker et al. 1977).

Meadow horsetail (*Equisetum pratense*)

The distribution of this species is circumboreal, south in North America to New Jersey, Iowa, Colorado, and British Columbia (NatureServe 2000). The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Within the planning area, meadow horsetail is known from 11 populations in North Dakota (North Dakota Natural Heritage database 2000). In addition, the species is known from very limited distribution in South Dakota (Great Plains Flora Association 1977). In the northern Great Plains, it occurs on the periphery of its natural range.

The populations in North Dakota range in size from three to 100 individuals. Some of the known populations in North Dakota are currently grazed. Habitat threats include grazing, alteration of the hydrologic regime and competition from invasive species including smooth brome and Kentucky bluegrass (North Dakota Natural Heritage database 2000). Ownership of the North Dakota populations is mixed between Forest Service System lands, state, and private land.

Habitat for meadow horsetail includes boggy banks, lowland woodlands, and wooded riparian banks usually along the Sheyenne River (ND Parks and Recreation Dept. 1990, Seiler 1973, Barker et al. 1977).

Loesel's Twayblade (*Liparis loeselii*)

The distribution of Loesel's twayblade includes Quebec south to North Carolina, west to Kansas, and northwest to the Northwest Territories (NatureServe 2000). The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Within the planning area, this species is known from 11 populations in North Dakota and very limited representation in Nebraska and South Dakota (North Dakota Natural Heritage database 2000; Great Plains Flora Association 1977, NatureServe 2000). Although this species is relatively widespread in the eastern United States, it is generally considered rare throughout its range.

In North Dakota, the populations range in size from two individuals to 50 individuals. Some of the known populations are threatened by altered site hydrology due to dugouts and roads. In addition, grazing, livestock trampling, and cow trails threaten some populations (North Dakota Natural Heritage database 2000). Habitat threats include alteration of the hydrologic regime, competition from invasive species, and livestock grazing and trampling. In North Dakota, ownership is a mix between U.S Forest System lands, private, state, and Nature Conservancy lands.

In Nebraska, Loesel's twayblade has recently been found on the Samuel R. McKelvie National Forest (Rolfsmeier 1995; Nebraska Natural Heritage Program 2000).

Habitat includes marl pools, fens, lowland swales, and bottomlands (North Dakota Natural Heritage database 2000, ND Parks and Recreation Dept. 1990) as well as wet wooded areas (Barker et al. 1977).

Sensitive fern (*Onoclea sensibilis*)

Distribution of sensitive fern includes Newfoundland south to Florida, west to Texas, and north to Saskatchewan (NatureServe 2000). The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Sensitive fern is known from only 11 populations in North Dakota where the species is on the edge of its distributional range (North Dakota Natural Heritage database 2000). However, within the planning area, the species is more represented in southern South Dakota and north central and northeastern Nebraska (Great Plains Flora Association 1977).

In North Dakota, some of the records are historical and several records have not been recently confirmed. Populations range in size from six to several hundred individuals. Some of the populations have been reported to be declining (North Dakota Natural Heritage database 2000). Threats to habitat include livestock grazing, trampling, and trailing; alteration of the hydrologic regime; and competition from invasive species. Most of the populations lie on private land, with only two populations known from USFS lands. The North Dakota Heritage Program Element Occurrence Ranks for known occurrences of this species include fair to marginal viability (North Dakota Natural Heritage database 2000).

Habitat includes moist open woodland (Barker et al. 1977). In addition, habitat in North Dakota is described as alder thickets, wet hardwood forest, wetland thicket-forest ecotones, and seep and spring areas (North Dakota Natural Heritage database 2000).

Crested woodfern (*Dryopteris cristata*) and Spinulose woodfern (*Dryopteris carthusiana*)

Distribution of crested woodfern includes Quebec south to Georgia, west to Nebraska and north to British Columbia (NatureServe 2000). The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Within the planning area, the species is on the edge of its range in North Dakota where it is only known to occur in six counties in the eastern and northern portions of the state. Crested woodfern is also known from limited occurrences in Nebraska where it is also peripheral to its main range (Nebraska Natural Heritage Program 2000; Great Plains Flora Association 1977).

Distribution of spinulose woodfern includes Newfoundland south to Georgia, west to Nebraska and Oregon, and north to Yukon Territory (NatureServe 2000). The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Within the planning area, the species is on the edge of its range in North Dakota where it is only known to occur in four counties in southeastern and northeastern portions of the state. Spinulose woodfern is also known from limited occurrences in Nebraska where it is also peripheral to its main range (Nebraska Natural Heritage Program 2000; Great Plains Flora Association 1977).

Crested woodfern and spinulose woodfern are both ranked as S3 species in North Dakota (North Dakota Natural Heritage Inventory 1999), known in the state from 20 to 30 populations. However, threats to known populations and habitats are very high and many of the known populations contain few individuals. In addition, some of the known populations are from historical records or records that have not been recently confirmed (North Dakota Natural Heritage database 2000).

Current threats to spinulose and crested woodfern populations include degraded habitat, livestock grazing and trailing, alteration of the hydrologic regime, and invasive plant species (North Dakota Natural Heritage database 2000). In North Dakota, ownership of the known populations is a mix of U.S. Forest Service, private, state, and Nature Conservancy lands. For spinulose woodfern, ten of the known populations are on USFS administered lands (North Dakota Natural Heritage database 2000). For crested woodfern, eight populations are found on USFS lands.

Habitat of spinulose woodfern includes low hummocks, ravines, streambanks, moist woods, river terrace seeps, and wetland thickets (North Dakota Natural Heritage database 2000, North Dakota Parks and Recreation 1990, Seiler 1973; Barker et al. 1977). Crested woodfern is found growing in similar habitat, often in conjunction with spinulose woodfern (North Dakota Natural Heritage database 2000, ND Parks and Recreation 1990).

Buckbean (*Menyanthes trifoliata*)

The distribution of buckbean is circumboreal, extending south in North America to North Carolina, west to Missouri, Colorado, Arizona, and California (NatureServe 2000). The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Within the planning area, buckbean is ranked as S3 in North Dakota (North Dakota Natural Heritage Inventory 1999) where it is considered locally abundant. The species is also known from very limited occurrences in South Dakota and northern Nebraska (Larson 1993).

In North Dakota, buckbean is known from several large populations of over 10,000 individuals in the eastern part of the state (North Dakota Natural Heritage database 2000). However, threats to some of the known populations include wetland drainage and habitat degradation from livestock grazing and trampling. Habitat is documented as being in declining condition in several of the known populations (North Dakota Natural Heritage database 2000). A few populations receive protection from grazing by fencing, especially on USFS land. Fewer than four populations are known to be on land administered by the U.S. Forest Service with the majority of the populations on private land.

Habitat for buckbean includes bogs and swamps (Great Plains Flora Association 1986). In North Dakota, buckbean is found in sphagnum bogs, rich fens, bog birch fens, and calcareous fens (North Dakota Natural Heritage database 2000).

Bog willow (*Salix pedicellaris*)

Delicate sedge (*Carex leptalea*)

Labrador bedstraw (*Galium labradoricum*)

Marsh bellflower (*Campanula aparinoides*)

Marsh fern (*Thelypteris palustris*)

Showy lady's slipper (*Cypripedium reginae*)

Umbrella flatsedge (*Cyperus diandrus*)

The above species are also considered rare within parts of the planning area and their distributional ranges are varied across the northern Great Plains. These species may be either scarce or locally abundant within the planning area. For example, bog willow and delicate sedge are known only from eastern North Dakota in the planning region. Marsh bellflower is known from limited occurrences in South Dakota and north central Nebraska as well as eastern North Dakota (Great Plains Flora Association 1977). Marsh fern is well distributed throughout Nebraska and is known from a few populations in South Dakota, but the species is on the edge of its range in eastern North Dakota. Showy lady's slipper is not known in the planning area except for the eastern North Dakota populations that are on the distributional edge of the species. Umbrella flatsedge is well distributed in the eastern portions of Nebraska within the planning area, however the North Dakota populations are on the peripheral edge of the species range (Great Plains Flora Association 1977). Some of the species known only from eastern North Dakota may have the potential to occur on the Samuel R. McKelvie and Nebraska National Forests in the Nebraska sandhills.

The global rank of showy lady's slipper is "G4" meaning uncommon but not rare (although it may be rare in parts of its range, particularly on the periphery), and usually widespread. It is apparently not vulnerable in most of its range, but possibly cause for long-term concern. The other species within this guild are ranked as "G5" meaning common, widespread, and abundant (although they may be rare in parts of their range, particularly on the periphery). All of the above species are ranked as either S2/S3 or S3 species in North Dakota (North Dakota Natural Heritage Inventory 1999).

Within North Dakota, these seven species may have larger population sizes, greater protections to habitat, or larger numbers of known populations than some of the other species within the Eastern Prairie Boggy Wetland plant group (North Dakota Natural Heritage database 2000). North Dakota Heritage Program Element Occurrence rankings for these species range from excellent to fair for viability based upon population size, population condition, and landscape context (North Dakota Natural Heritage database 2000).

For these seven species, threats to populations on the Sheyenne National Grassland include reduced spring and seep flow, livestock grazing and trampling, streambank erosion, and invasive plant species (North Dakota Natural Heritage database 2000). Threats to habitat include alteration of the hydrologic regime, invasive plant species, and livestock grazing and trailing.

Conservation Planning

A state-wide or regional conservation plan has not been prepared for species within this guild.

Direct and Indirect Effects on NFS Lands

Noxious weeds such as leafy spurge occur in scattered populations throughout the tallgrass prairie. Noxious weeds such as leafy spurge and Canada thistle reduce the quality of sensitive species habitat but at the same time, efforts to control spurge and other invasive species with chemicals can pose a direct threat to sensitive species. Noxious weed control could affect the forbs, ferns, and willow species in this plant group. In addition, many chemicals are restricted for use within riparian areas. Chemical treatment of noxious weeds is not recommended in the habitats supporting this plant group.

Competition from other non-native invasive plants (exotics) can be a threat. Invasive species such as Kentucky bluegrass and smooth brome can compete with native species for habitat, significantly reducing the diversity of native species.

Livestock trampling can be a problem for the sensitive species within this guild. Trampling may be detrimental to delicate plants such as showy lady's slipper, sensitive fern, marsh bellflower, and others. In addition, excessive and repeated soil compaction from trampling may result in reduced plant vigor.

On the Sheyenne National Grassland, some of the habitat where this plant group occurs has been excluded from grazing allotments through fencing. In allotments where grazing is occurring, habitat disturbance occurs from trailing and trampling by livestock. These areas are typically very shaded and livestock use these areas for shade in the heat of the summer, if accessible.

Livestock grazing can prevent sensitive plants from completing their life cycles and producing seeds or spores. In addition, excessive and continuous livestock grazing on sensitive plants can lead to impacts on plant regrowth, thereby reducing the vigor of plants within the population. However, there is typically little livestock forage produced in most of these habitats. Some of the species in this plant group that are palatable to cattle include delicate sedge, the two species of cottongrass, and the two species of flatsedge. Even though these particular species are considered grasslike, livestock graze on them on a limited basis. Early season grazing of flatsedge, an annual species, would be detrimental and not allow completion of its life cycle. Sheep and goats used for leafy spurge control would graze on some the plant species in this group if they have accessibility to their habitats.

Burning may directly impact sensitive plant species by causing mortality or indirectly impact these species and communities through effects on the habitat. The riparian zones currently supporting this plant group may not have been exposed to as frequent a fire regime as other parts of the tallgrass prairie.

Recreational river use may increase in these habitats as users explore shorelines from the river. While these habitats are not conducive to camping due to their wet nature, they are easily disturbed by trampling and root shearing.

Recreation can have effects on sensitive plants or plant populations, depending on types of recreational use, road and trail use patterns and intensities, rate of spread of invasive, non-native plant species along recreational routes, and other factors.

Roads can negatively affect sensitive plant populations by introducing non-native plant species along travel routes, through habitat fragmentation, and by loss of suitable habitat to disturbance.

Increased rates of channelization in drainages can result in a lowered water table. Activities that lower water tables below the root zone of some sensitive plant species may place individual or populations of sensitive plant species at risk.

Cumulative Effects

Noxious weeds will likely remain a threat in the habitats of these species on private and public lands in and around the administrative units containing these species.

At one time the wetlands of the tallgrass prairie were more plentiful, but many wetlands have been drained for agriculture purposes (Gantt 1980, Burgess 1964, Ostlie et al. 1997, Batt 1996, Johnson 1998). Current management practices that may affect plant community viability include drainage ditches and center-pivot irrigation systems, non-native plant species, lack of fire, and livestock grazing.

Continued loss of suitable habitat through conversion of rangelands to croplands and draining of croplands can be expected to occur on private lands (Ostlie et al. 1997, USDA Forest Service 2000).

Livestock grazing practices that are unfavorable for the conservation of sensitive plant species are likely to continue on some private lands.

Chemical treatment of noxious weeds on adjacent uplands poses the threat of groundwater contamination to the surface aquifer that feeds the seepage areas found in this guild. This could put the ferns, forbs, and shrubs found in this plant group at risk.

Drainage ditches on adjacent private land may lower water table levels below the root zone of some sensitive plant species, putting individuals or populations at risk. In addition, cumulative effects from altering the hydrologic regime of the area from drainage ditches and irrigation could induce relative drought on these areas, possibly preventing the plants from completing their life cycle and / or killing the plants.

Development activities such as road and building construction on private lands will continue, resulting in some loss of suitable habitat for sensitive plant species and possible mortality of sensitive plants and population loss.

Interrelated and Interdependent Actions

Determining federal range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement. Detrimental grazing activities on private land may increase the importance of the existing populations of sensitive species on federal land.

Conservation Measures

The following conservation measures are presented as management direction under Alternative 3 in the revised LRMP:

Unit-wide Direction (Chapter 1)

SNG

- Avoid placing new facilities and other developments such as water tanks and impoundments, in habitat occupied by sensitive plants species (Guideline).
- Identify sensitive plant habitats and rare plant communities as priorities for noxious weed and invasive plant monitoring and control (Guideline).
- Avoid the use of noxious weed and invasive plant control methods that may negatively impact sensitive plants (Guideline).
- Design timing, intensity, and frequency of mowing, burning and livestock grazing to maintain or increase sensitive plant species populations (Standard).
- Do not authorize vegetation management and construction projects that would further isolate or prevent re-colonization of sensitive plant populations from adjacent populations (Standard).
- Maintain hydrological regimes and protect and restore developed springs and seeps where habitat for sensitive plant species would be enhanced (Guideline).
- Ensure that management actions do not contribute to loss of population viability for Forest Service sensitive plant species (Standard).
- Protect known sensitive plant populations from land use activities that cause increased trampling or soil compaction within key habitats (Guideline).
- Enhance and improve habitat for known sensitive plant populations through restoration programs (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

SNG, SRMNF, NNF (BRD)

- Manage land treatments to conserve site moisture and to protect long-term stream, wetland, and riparian health from damage by increased runoff (Standard).
- Allow only those actions next to wetlands that maintain or improve long-term proper functioning of riparian ecosystem conditions (Standard).
- Design activities to protect and manage the riparian ecosystem and its integrity (Standard).

- Maintain and protect the hydrologic regime that supplies ground water to the wetlands (Standard).
- Locate activities and facilities away from riparian areas and wetlands unless alternatives have been assessed and determined to be more environmentally damaging (Guideline).
- Do not deposit waste material below high water lines, in riparian areas, in areas immediately adjacent to riparian areas, or in natural drainage-ways (Guideline).
- Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function and meet regulations found in Section 404(b)(1) of the Clean Water Act (Standard).

Geographic Area Direction (Chapter 2)

SNG

- Develop and initiate implementation of conservation strategies plants within this guild (Guideline).
- Conduct target plant surveys or baseline assessments for species within this guild (Guideline).
- Avoid activities that would negatively impact the hydrologic regime of the Sheyenne River and the Sheyenne aquifer (Guideline).
- Protect habitat supporting this guild from livestock grazing (Guideline).
- Avoid use of goats or sheep for noxious weed control in habitats supporting this guild (Guideline).
- Avoid placing water developments, oilers, livestock salt, or mineral near or in habitats supporting this guild (Guideline).
- Designate and sign recreation trails in areas adjacent to or within the wetland habitats of this guild in order to encourage users to remain on designated trails (Guideline).

SNG, SRMNF, NNF (BRD)

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).

Management Area Direction (Chapter 3)

SNG (MA 3.64)

- Limit all motorized use to administrative use (Standard).
- Protect wetlands habitats to maintain their hydrologic regimes (Standard).
- Maintain disturbance processes if required for habitat enhancement, restoration or species viability (Standard).
- Allow no new road or trail construction except when necessary to correct resource damage occurring from existing sites (Standard).

SNG (MA 3.64), cont.

- Conflicts that cannot be mitigated are resolved in favor of specific plant and wildlife species and communities (Standard).
- Prohibit removal of mineral material (Standard).
- Do not include this management are in any grazing allotment. However, livestock grazing may be used as a tool to achieve desired conditions (Guideline).
- No new utility corridors or additional development within existing corridors will be permitted. Existing corridors may be maintained until they are abandoned (Standard).
- Prohibit new special-use facilities except for valid existing rights (Guideline).

Monitoring Direction (Chapter 4)

SNG

- Monitor populations of these species.

SNG, SRMNF, NNF (BRD)

- Monitor the effectiveness of the suggested stocking rates in Appendix I in meeting desired vegetation composition and grassland structure levels.

Appendices

SNG, SRMNF, NNF (BRD)

- Appendix I provides suggested stocking rates for various livestock grazing intensities. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

SNG (all species in this plant group)

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Habitat enhancement and restoration of natural processes are proposed that should benefit species in this guild (USDA Forest Service 2000). In addition, some of the proposed management activities should provide additional specific protection measures for known populations of the species.

Many of the known populations of species in this guild are known from habitats associated with the Sheyenne River corridor. Therefore, the Sheyenne River has been placed under 3.64 management area direction for special plant and wildlife habitat. The objective of this management area is to maintain and enhance specific plant and wildlife species of concern and plant and wildlife communities with additional emphasis on habitat improvement.

Some of the sensitive plant species populations for these species are protected within livestock exclosures and are not accessible to livestock grazing or trampling. For example, all known sites of buckbean and bog willow are currently in areas excluded from grazing by fencing. On the Sheyenne National Grassland, some populations of other species in this plant group are currently protected through fencing or modified grazing strategies. The analysis for these species assumes that these exclosures will remain in place and will be maintained.

The existing Sheyenne Springs RNA offers some protection for some of the species and their habitats. Protection for a few of the species is also provided by The Nature Conservancy's Pigeon Point Preserve and the ND State Game and Fish Department Mirror Pool Wildlife Management Area.

Alternative 3 provides direction to restore fire, rest, and herbivory as natural ecological processes to varying levels. Under the management activities proposed by these alternatives, habitats should be enhanced for the species within this plant group. Known populations should receive adequate protection. Some losses may occur within populations to individuals. However, populations should remain viable throughout the planning unit, planning area, and rangewide.

Outcome IV is selected as the risk assessment for marsh bellflower, crested shield fern, buckbean, marsh fern, bog willow, spinulose woodfern, delicate sedge, umbrella flatsedge, Labrador bedstraw, and showy lady's slipper. Habitat is limited to wetland refugia in the vicinity of the planning unit. Much of the wetland habitat for these species on other land jurisdictions in the planning area has been lost. Habitat enhancement will be needed in some areas. Re-introductions of these species should not be necessary.

Outcome VI is selected as the risk assessment for slender cottongrass, shining flatsedge, Loesel's twayblade, meadow horsetail, marsh horsetail, and sensitive fern. These species are considered extremely rare on the planning unit and in the planning area and habitat is limited to wetland refugia. Much of the wetland habitat for these species on other land jurisdictions has been lost. Re-introductions or population augmentation may be required for these species.

SRMNF, NNF (BRD)

Biological determinations are not made for these species on these areas since they are not listed as sensitive by Region 2 of the Forest Service. The conservation measures listed above are expected to enhance habitat and/or protect these habitats and species from possible adverse effects of Forest Service authorized activities and allocations.

Tallgrass Prairie Wetlands Guild

Plant species in this guild include:

Little grapefern

Small white lady's slipper

Adder's tongue fern

Table H-6 summarizes species occurrence and status in the planning area. Each of these species is classified as sensitive by Region 1 of the Forest Service.

Guild Description

This plant group includes species found in habitats associated with lowland swales, wetland depressions, marshes, and the sedge / willow complexes found predominately within the tallgrass prairie regions of the planning area. All the currently known populations of species associated with this group occur in habitats of the Sheyenne National Grassland of eastern North Dakota (North Dakota Natural Heritage database 2000). Adder's tongue fern is also known to occur on the Samuel R. McKelvie NF in Nebraska and could occur on the Nebraska National Forest (BRD).

Two of the species, adders's tongue and small white lady's slipper, occur in the mid-range of versatility, i.e. they are associated primarily with one habitat type but may also be found in other habitat types (North Dakota Natural Heritage database 2000, Bowles 1983, ND Parks and Recreation Dept. 1990, USDA Forest Service 2000). On the Sheyenne National Grassland, little grapefern occurs in the narrow range of versatility based upon current habitat information (North Dakota Natural Heritage database 2000). In addition, the western prairie fringed orchid (*Platanthera praeclara*), a threatened plant species, also occurs within habitats associated with this plant group.

Within the Northern Great Plains planning area, the habitat components captured by this plant group are uncommon and occupy a very small percentage of the total land base (ND Parks and Recreation 1990, Seiler 1973). Mesic areas that provide habitat on other portions of the planning area may differ in habitat, soils, and hydrologic regime from those described for the Sheyenne National Grassland, however these other habitats share the common feature of having a moisture regime which may vary annually or seasonally.

Very little private, state, or other federal lands exist within the planning unit that would provide habitats contained within this guild. In addition, the small fragments of tallgrass prairie on private land may be unoccupied habitat and seed sources may not be present for colonization of the species in this plant group.

On the Sheyenne National Grassland, the habitats associated with this plant group have developed under broad landscape disturbance processes. However, they are primarily distinguished by their high groundwater tables. In addition, these areas collect runoff that often remains for considerable periods (Seiler 1973). For example, the lowland swales found within the Sheyenne National Grassland tallgrass prairie experience seasonal fluctuations of the water table as well as widely varying annual fluctuations. During high precipitation climate cycles, the swales may be inundated with water for most of the growing season, whereas during drier years the swales may lose their standing water (Seiler 1973).

In the tallgrass prairie of North Dakota, temporarily flooded lowland swales are frequently dominated by wooly sedge (Seiler 1973). The wetter lowland marshes are dominated by emergent aquatics such as sedges, bulrushes, rushes, spikerushes, common cattail and other tall graminoid species (Gantt 1980). Gantt (1980) notes that early historical records describe bluejoint and red top as the primary marsh species.

At one time, the wetlands of the tallgrass prairie were more plentiful, however much of the tallgrass prairie has been converted for agriculture purposes (Ostlie et al. 1997, Chuluun et al. 1997). According to Gantt (1980) the tallgrass prairie as it existed almost 100 years ago is virtually non-existent today. Studies of vegetation change by Burgess (1964) and others support this. Current management practices that may affect plant species and community viability

include drainage ditches that alter hydrologic regimes, competition to native flora from non-native plant species, insufficient fire regime, and grazing.

Information on Individual Plant Species:

Little Grapefern (*Botrychium simplex*)

Distribution of little grapefern includes Newfoundland and Quebec, south to North Carolina, west through Illinois, Mississippi, New Mexico, and California, and north to Alaska (NatureServe 2000). The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). In North Dakota, little grapefern is known from one verified population and an additional unverified population (North Dakota Natural Heritage database 2000). The size of the populations ranges from 10 to 30 individuals. Threats to the known population on USFS land includes livestock trampling and flooding from the recent wet climatic cycle (North Dakota Natural Heritage database 2000; K.Hansen, personal communication). It has also been found in South Dakota (NatureServe 2000).

North Dakota populations have been found in shaded swales in tallgrass prairie communities (North Dakota Natural Heritage database 2000).

Adder's tongue (*Ophioglossum pusillum*)

Adder tongue is found in Quebec, south to North Carolina; west though Missouri, Nebraska, Montana, and California; and north to Alaska (NatureServe 2000). Within the planning area, adder's tongue is known from 21 populations in North Dakota (North Dakota Natural Heritage database 2000) and has been reported from a limited number of populations in Nebraska and South Dakota. The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery) (NatureServe 2000).

Prior to 1993, many of the known North Dakota populations were small, however the recent wet climatic cycle has resulted in larger numbers of individuals and new populations (K.Hansen, personal communication). The 1993 U.S. Forest Service Rare Plant Survey Report for the Sheyenne National Grassland documents numerous new sites and larger population sizes. Since that time, some of these sites have become flooded with unknown effects upon the populations. Threats from management include livestock trampling and alteration to the hydrologic regime. Noxious weed spraying is restricted in wetland habitats and should not affect the species. New populations have been discovered for this species within recently burned areas, which suggests that the species may be dependent upon a burning regime (K.Hansen, personal communication).

Small white lady's slipper (*Cypripedium candidum*)

Distribution of small white lady's slipper includes Ontario south to Virginia, west to Missouri and Nebraska, and north to Saskatchewan (NatureServe 2000). Within the planning area, small white lady's slipper is known from eastern North Dakota and South Dakota, and eastern and central Nebraska (Great Plains Flora Association 1977). The global rank of small white lady's slipper is "G4" meaning uncommon but not rare (although it may be rare in parts of its range, particularly on the periphery), and usually widespread. It is apparently not vulnerable in most of its range, but possibly cause for long-term concern.

In North Dakota, small white lady's slipper 40 populations have been recorded (North Dakota Natural Heritage database 2000). The populations range in size from few individuals to very large (1000+ individuals) (North Dakota Natural Heritage database 2000). Some of the records are historic or have not been recently confirmed. Threats to known populations include competition from leafy spurge, livestock grazing and trampling, litter buildup from lack of fire, and altered hydrologic regime (North Dakota Natural Heritage database 2000, Bowles 1983). Ownership of many of the sites in North Dakota lies on private land with a few populations on Forest Service system lands.

Direct and Indirect Effects on NFS Lands

Noxious weeds such as leafy spurge occur in scattered populations throughout the tallgrass prairie. Noxious weeds reduce the quality of sensitive species habitat but at the same time, efforts to control spurge and other invasive species with chemicals can pose a direct threat to sensitive species.

Competition from other non-native invasive plants (exotics) can be a significant threat. Invasive species such as Kentucky bluegrass and smooth brome often form monocultures, significantly reducing the diversity of native species. Some types of livestock grazing seem to encourage spread of these invasive species while some grazing strategies can reduce rates of encroachment and spread.

Roads can negatively affect sensitive plant populations by introducing non-native plant species along travel routes, through habitat fragmentation, and by loss of suitable habitat to disturbance.

Recreation can have effects on sensitive plants or plant populations, depending on types of recreational use, road and trail use patterns and intensities, rate of spread of invasive, non-native plant species along recreational routes, and other factors.

Increased rates of channelization in drainages can result in lowered water tables. Activities that lower water tables below the root zone of some sensitive plant species may place individual plants or populations at risk.

Burning, livestock grazing, and mowing can have positive or negative effects on sensitive plant species, depending on frequency, intensity, and timing of disturbance and on the reproductive characteristics of the individual plant species. Properly timed grazing, burning, and mowing may be beneficial in maintaining the quality of native grassland habitats. Lack of disturbance can cause some sites to convert to shrub habitats dominated by willow species.

Burning may directly impact sensitive plant species by causing mortality or indirectly impact these species and communities through effects on the habitat. Mowing and summer burning may prevent a completion of the life cycle for the small white lady's slipper. Adder's tongue is too short structurally to be affected by mowing but would affected by summer burning. Little grape fern occurs in willow thickets which are not mowed but would be affected by summer burning. Early spring and late fall burning should have no effect on any of the species and may be beneficial.

Early season livestock grazing can prevent sensitive plants from completing their life cycles and producing seeds or spores. Excessive and continuous livestock grazing on sensitive plants can lead to impacts on plant regrowth, thereby reducing the vigor of plants within the population. The species within this plant group are not considered palatable to cattle but could be grazed by sheep or goats. However, grazing can also reduce dead material within plant communities and open up canopy layers of plants, allowing for the germination and establishment of new plants.

Livestock trampling can be a problem under some circumstances for the sensitive species within this plant group. Trampling could be detrimental to individual plants because all three species are delicate fleshy plants. In addition, excessive and repeated soil compaction from trampling may result in reduced plant vigor.

Repeated mowing may prevent some sensitive plant species from completing their life cycle and may also reduce carbohydrate reserves. Mowing should have no affect after seed set / spore dispersal.

Cumulative Effects

Continued loss of suitable habitat through conversion of rangelands to croplands can be expected to occur on private lands (Ostlie et al. 1997, USDA Forest Service 2000).

It is likely that noxious weeds will remain as threats in the habitats of these species on private and public lands in and around the project area (Ostlie et al. 1997).

Livestock grazing and mowing practices that are unfavorable for the conservation of sensitive plant species are likely to continue on some private lands.

Development activities such as road and building construction on private lands will continue, resulting in some loss of suitable habitat for sensitive plant species and some possible mortality of sensitive plants and population loss.

Drainage ditches on adjacent private land may lower water table levels below the root zone of some sensitive plant species, putting individuals or populations at risk.

Insecticide spraying on adjacent croplands may reduce or threaten insect pollinators for some sensitive plant species (Arenz and Joern 1996, Oslie et al. 1997).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction under Alternative 3 in the revised LRMP:

Unit-wide Direction (Chapter 1)

SNG

- Avoid placing new facilities, other developments such as water tanks and impoundments, in habitat occupied by sensitive plant species (Guideline).
- Identify sensitive plant habitats and rare plant communities as priorities for noxious weed and invasive plant monitoring and control (Guideline).
- Avoid the use of noxious weed and invasive plant control methods that may negatively impact sensitive plants (Guideline).
- Design timing, intensity, and frequency of mowing, burning and livestock grazing to maintain or increase sensitive plant species populations (Standard).
- Do not authorize vegetation management and construction projects that would further isolate or prevent re-colonization of sensitive plant populations from adjacent populations (Standard).
- Maintain hydrological regimes and protect and restore developed springs and seeps where habitat for sensitive plant species would be enhanced (Guideline).
- Ensure that management actions do not contribute to loss of population viability for Forest Service sensitive plant species (Standard).
- Protect known sensitive plant populations from land use activities that cause increased trampling or soil compaction within key habitats (Guideline).
- Enhance and improve habitat for known sensitive plant populations through restoration programs (Guideline).
- Prohibit use of pesticides that would adversely affect species at risk (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

SNG, SRMNF, NNF (BRD)

- Manage land treatments to conserve site moisture and to protect long-term wetland health from damage by increased runoff (Standard).
- Allow only those actions next to wetlands that maintain or improve long-term proper functioning of ecosystem conditions (Standard).
- Design activities to protect and manage the riparian ecosystem. Maintain the integrity of the ecosystem, including quantity and quality of surface and ground water (Standard).
- Maintain and protect the hydrologic regime that supplies ground water to the wetlands (Standard).
- To provide protection for riparian areas, locate activities and facilities away from wetlands unless alternatives have been assessed and determined to be more environmentally damaging (Guideline).

- Do not deposit waste material below high water lines (Guideline).
- Maintain long-term ground cover, soil structure, water budgets, and flow patterns of wetlands to sustain their ecological function and meet regulations found in Section 404(b)(1) of the Clean Water Act (Standard).

Geographic Area Direction (Chapter 2)

SNG

- Burn approximately 40,000 acres per decade (Objective).
- Rest at least 5 percent of the suitable rangeland each year (Objective).
- Prohibit additional draining of the national grassland (Standard).
- Implement the most current Recovery Strategy for the Western Prairie Fringed Orchid covering land management activities for allotments containing orchids (Standard).
- Develop and implement conservation strategies for sensitive plants within this guild (Guideline).
- Conduct target plant surveys or baseline assessments for sensitive plants within this guild (Guideline).
- Avoid activities that would negatively impact the hydrologic regime of the Sheyenne River and Sheyenne aquifer (Guideline).

SNG, SRMNF, NNF (BRD)

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).

Management Area Direction (Chapter 3)

SNG (MA 2.2 and 3.66)

- Initiate intensive restoration efforts (MA 3.66) to meet desired conditions that include active and passive methods (Guideline).
- Prevent new introduction of non-native plant species (MA 3.66) into known areas of sensitive plant species or guilds (Guideline).
- The proposed Fritillary Prairie and Platanthera Prairie RNAs include habitat for this plant guild. RNAs will be managed to protect their ecological values. Management plans will be completed within 5 years (Objective).

Monitoring Direction (Chapter 4)

SNG

- Monitor populations and habitat.

SNG, SRMNF, NNF (BRD)

- Monitor the effectiveness of the suggested stocking rates in Appendix I in meeting desired vegetation composition and grassland structure levels.

Appendices

SNG

- Conservation measures identified in Appendix N for western prairie fringed orchid will also benefit this plant guild.

SNG, SRMNF, NNF (BRD)

- Appendix I provides suggested stocking rates for various livestock grazing intensities. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

SNG (all species in this plant group)

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Within this plant group, species have state rankings of S1, S2, and S2/S3 and range from critically imperiled to rare in North Dakota (North Dakota Natural Heritage Program 1999). Known element occurrences range from 1 known populations to 40 known populations. The known populations contain widely varying numbers of individuals within populations, ranging from one individual to 1000+ (North Dakota Natural Heritage database 2000).

Habitat enhancement and restoration through natural processes such as fire and rest are proposed that should benefit species in this guild. In addition, some of the proposed management activities should provide additional specific protection measures for known populations of the species. For example, grazing management and rest in both occupied and unoccupied habitat will follow management prescriptions in the Recovery Strategy for the western prairie fringed orchid that will be implemented under the Grassland Plan.

Under the proposed management, two new Research Natural Areas (RNA) are proposed. These RNAs would provide management direction and protection for species or habitat found within this group. The Planthera Prairie and Fritillary Prairie proposed RNAs contain populations of some of the sensitive species in this group.

The acres of rangeland annually rested from livestock grazing will more closely approximate the conditions under which some of the species evolved as compared to current grazing conditions. In addition, the level of prescribed fire is a positive move towards restoring the fire regime (USDA Forest Service 2000). Alternatives 3 provides for no net increase (from current levels) of noxious weeds. The existence and spread of noxious and exotic species is one of the primary threats to the maintenance of high quality tallgrass prairie habitat (USDA Forest Service 2000).

Some of the populations for these species are not accessible to livestock grazing or trampling. Other protections exist from modified grazing strategies.

Under the management activities proposed, habitats should be enhanced for the species within this plant group. Known populations should receive adequate protection. Losses may occur to individual plants within populations due to non-native plant species, grazing, and trampling. However, populations should remain viable throughout the planning unit, planning area, and rangewide.

Outcome VI is selected as the risk assessment for little grapefern. Rationale for outcome VI is that this species is known from very limited populations within the vicinity of the planning unit. This will result in strong limitations on interactions among local populations, high potential for genetic isolation, and uncertainty about the species response to climatic stochasticity. Populations occur on the Sheyenne National Grassland where habitat is threatened by serious competition from invasive and noxious weeds.

For adder's tongue and small white lady's slipper, outcome II is selected as the risk assessment under Alternative 3. Rationale for outcome II is that habitat of sufficient quality, quantity, and abundance occurs in the vicinity of the planning unit. Both species are known from numerous populations within the planning area and reintroductions of the species are not considered necessary. Land uses are managed on the planning units to avoid most adverse direct threats to the species, however other factors such as encroachment and invasion of exotic plant species are a serious threat on the Sheyenne National Grassland.

SRMNF, NNF (BRD)

Biological determinations are not made for these species on these areas since they are not listed as sensitive by Region 2 of the Forest Service. The conservation measures listed above are expected to enhance their habitat and/or protect the habitat and species from possible adverse effects of Forest Service authorized activities and allocations.

Tallgrass Prairie Deciduous Hardwoods Guild

Plant species in this guild include:

Northern ladyfern	Dogberry
Oak fern	Leathery grapefern
Foxtail sedge	Broad-leaved goldenrod.

Table H-6 summarizes species occurrence and status in the planning area. Each of these species is classified as sensitive by Region 1 of the Forest Service.

Guild Description

This plant group includes species that occur in the hardwood forests and woodlands found predominately on the tallgrass prairie regions of the planning area. All currently known populations of species in this plant group occur in habitats of the Sheyenne National Grassland of eastern North Dakota (North Dakota Natural Heritage database 2000). The communities within this group are characterized by broadleaf deciduous trees.

This plant group includes the green ash-boxelder community although it also contains other broadleaf species such as American elm and plains cottonwood. These communities occur upslope from the river gallery forests and intergrade into savanna then graminoid communities with increasing distance and elevation above the river valleys (Gantt 1980). Green ash and boxelder dominates areas where moisture runoff into ravines, coulees, or draws is sufficient to support woodland vegetation (Seiler 1973).

Within the Northern Great Plains planning area, the habitat components associated with this plant group are uncommon and occupy a very small percentage of the total land base (Seiler 1973, ND Parks and Recreation Dept 1990, Nelson 1964). Mesic woodlands and moist areas which provide habitat on other portions of the planning area may differ in habitat, soils, and hydrologic regime from those described for the Sheyenne National Grassland. However, these other habitats share the common feature of rich loam soils and mesic conditions which are capable of supporting a wooded habitat dominated by eastern deciduous hardwood trees such as bur oak and aspen.

Six plant species, including one shrub, one forb, one sedge and three ferns, are found in these wooded habitats. All six species occur in the mid-range of versatility, i.e. they are associated primarily with one habitat type but may also be found in other habitat types.

This plant group does not include river gallery forests (elm-basswood communities) such as those found along the Sheyenne River as these habitats are included in the tall grass prairie boggy wetlands plant group. Many of the same herbaceous forbs that occur in the elm-basswood community are found along the margins of the green ash-boxelder community although this later community is characterized by an overall greater abundance of grasses and sedges (Seiler 1973).

Information on Individual Plant Species:

Broad-leaved goldenrod (*Solidago flexicaulis*)

Distribution of broad-leaved goldenrod includes Quebec south to Georgia, west to Oklahoma, and north to Ontario. Within the planning area, broad-leaved goldenrod has been documented from limited populations in South Dakota, North Dakota, and Nebraska. The global rank of this species is “G5” meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery) (NatureServe 2000).

Broad-leaved goldenrod is known from four populations in North Dakota. Population sizes range from very small (one individual) to large (200 individuals). Threats to populations include livestock grazing and trampling. Only one population is found on USFS land. Extreme habitat degradation is recorded for this site (North Dakota Natural Heritage database 2000).

Oak Fern (*Gymnocarpium dryopteris*)

Distribution of oak fern includes Newfoundland south to West Virginia, west to Illinois, South Dakota, New Mexico, and Arizona, and north to Alaska. Within the planning area, oakfern is recorded from North Dakota and South Dakota. The global rank of this species is “G5,” meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery) (NatureServe 2000). Oak fern is known from three populations in North Dakota (North Dakota Natural Heritage database 2000). Population sizes range from 50 individuals to several hundred, although reproduction is uncertain at one of the sites (North

Dakota Natural Heritage database 2000). Threats include livestock trampling to the fragile species and habitat degradation. Only one population is found on USFS land.

Leathery grapefern (*Botrychium multifidum*)

Distribution of leathery grapefern includes Newfoundland south to North Carolina, Illinois, Nebraska, New Mexico, and California, and north to Alaska. The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Within the planning area, oakfern has been documented from limited populations in Nebraska, South Dakota, and North Dakota (NatureServe 2000). Leathery grapefern is known from two populations in North Dakota (North Dakota Natural Heritage database 2000). Each population contains less than ten individuals. Its habitat includes the margin of a pond associated with green ash and bur oak overstories (Heidel et al. 1992) and a mesic depression associated with bur oak / quaking aspen overstory (North Dakota Natural Heritage database 2000). Threats include livestock trampling to the fragile species. Only one population is found on USFS land.

Foxtail sedge (*Carex alopecoidea*)

Foxtail sedge distribution includes Quebec, south to Tennessee west to Wyoming, and north to Saskatchewan. The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Within the planning area, it has been documented from South Dakota and North Dakota and is tracked as rare in both states (NatureServe 2000). Foxtail sedge is known from five populations in North Dakota (North Dakota Natural Heritage database 2000). It is considered locally abundant at some of the populations with 100+ individuals present. Threats include livestock grazing and trampling, alterations to the hydrologic regime, and invasive plant species (North Dakota Natural Heritage database 2000). Only two populations are found on USFS land.

Dogberry (*Ribes cynosbati*)

Dogberry distribution includes Quebec, south to Georgia, west to Oklahoma, and north to Manitoba. The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Within the planning area, it occurs in North Dakota and South Dakota (NatureServe 2000). It is known from five populations in North Dakota (North Dakota Natural Heritage database 2000). The one known population on USFS land is large, containing over 1000+ individuals. Habitat includes river bottom woods (Barker et al. 1977). Threats include livestock trampling, alterations to habitat from livestock shading practices, alteration to the hydrologic regime, and invasive plant species (North Dakota Natural Heritage database 2000; K. Hansen, personal communication). All other populations are found on private land.

Northern lady fern (*Athyrium filix-femina*)

Distribution of northern lady fern includes all of North America (NatureServe 2000). Northern lady fern is known from 38 populations in North Dakota (North Dakota Natural Heritage database 2000). The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). In North Dakota, population sizes vary from very small (less than 10 individuals) to colonies of several thousand. Habitats include moist woods, meadows, and streambanks (Barker et al. 1977). Threats include livestock trampling, alterations to habitat from livestock grazing, alteration to seeps and slope habitat, and invasive plant species. Some of the habitat degradation is recorded

as severe (North Dakota Natural Heritage database 2000). Approximately ten of the populations are known from USFS lands with the majority of the populations found on private land.

Direct and Indirect Effects on NFS Lands

Noxious weeds, such as leafy spurge, occur in scattered populations throughout the tallgrass prairie. Noxious weeds reduce the quality of sensitive species habitat but at the same time, efforts to control spurge and other invasive species with chemicals can pose a direct threat to sensitive species.

Competition from other non-native invasive plants (exotics) can be a significant threat. Invasive species such as Kentucky bluegrass and smooth brome often form monocultures, significantly reducing the diversity of native species. Some types of livestock grazing seem to encourage spread of these invasive species while some grazing strategies can reduce rates of encroachment and spread.

Roads can negatively affect sensitive plant populations by introducing non-native plant species along travel routes, through habitat fragmentation, and by loss of suitable habitat to disturbance.

Recreation can have effects on sensitive plants or plant populations, depending on types of recreational use, road and trail use patterns and intensities, rate of spread of invasive, non-native plant species along recreational routes, and other factors.

Increased rates of channelization in drainages can result in lowered water tables. Any activities that lower water tables below the root zone of some sensitive plant species may place individual plants or populations at risk.

Burning, livestock grazing, and mowing can have positive or negative effects on sensitive plant species, depending on frequency, intensity, and timing of disturbance and on the reproductive characteristics of the individual plant species. Properly timed grazing, burning, and mowing may be beneficial in maintaining the quality of native grassland habitats. Lack of disturbance can cause some sites to convert to shrub habitats dominated by willow species.

Burning may directly impact sensitive plant species by causing mortality or indirectly impact these species and communities through effects on the habitat.

Livestock grazing can prevent sensitive plants from completing their life cycles and producing seeds or spores. Excessive and continuous livestock grazing on sensitive plants can lead to impacts on plant regrowth, thereby reducing the vigor of plants within the population. Some of the species within this plant group may be palatable to cattle as well as sheep or goats. However, there is typically little livestock forage produced in these habitats, and livestock use these areas mainly for shade.

Grazing can reduce dead material within plant communities and open up canopy layers of plants, allowing for the germination and establishment of new plants.

Livestock trampling can be a problem under some circumstances for the sensitive species in this plant group. Trampling could be detrimental to delicate plants such as lady fern, oak fern, and leathery grapefern. In addition, excessive and repeated soil compaction from trampling may result in reduced plant vigor.

Cumulative Effect

It is likely that noxious weeds will remain as threats to the habitats of these species on private and public lands in and around the administrative units containing these species.

Continued loss of suitable habitat through conversion of rangelands to croplands can be expected to occur on private lands (Ostlie et al. 1997, USDA Forest Service 2000).

Livestock grazing and mowing practices that are unfavorable for the conservation of sensitive plant species are likely to continue on some private lands.

Development activities such as road and building construction on private lands will continue, resulting in some loss of suitable habitat for sensitive plant species and some possible mortality of sensitive plants and population loss.

Insecticide spraying on adjacent croplands may reduce or threaten insect pollinators for some sensitive plant species (Arenz and Joern 1996, Ostlie et al. 1997).

Drainage ditches on adjacent private land may lower water table levels below the root zone of some sensitive plant species, putting individuals or populations at risk.

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction under Alternative 3 in the revised LRMP:

Unit-wide Direction (Chapter 1)

SNG

- Avoid placing new facilities and other developments such as water tanks and impoundments in habitat occupied by sensitive plant species (Guideline).
- Identify sensitive plant habitats and rare plant communities as priorities for noxious weed and invasive plant monitoring and control (Guideline).
- Avoid the use of noxious weed and invasive plant control methods that may negatively impact sensitive plants (Guideline).
- Design timing, intensity, and frequency of mowing, burning and livestock grazing to maintain or increase sensitive plant species populations (Standard).
- Do not authorize vegetation management and construction projects that would further isolate or prevent re-colonization of sensitive plant populations from adjacent populations (Standard).
- Maintain hydrological regimes and protect and restore developed springs and seeps where habitat for sensitive plant species would be enhanced (Guideline).
- Ensure that management actions do not contribute to loss of population viability for Forest Service sensitive plant species (Standard).

SNG, cont.

- Protect known sensitive plant populations from land use activities that cause increased trampling or soil compaction within key habitats (Guideline).
- Enhance and improve habitat for known sensitive plant populations through restoration programs (Guideline).
- Prohibit use of pesticides that would adversely affect species at risk (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

SNG

- Develop and initiate implementation of conservation strategies for plants within this guild (Guideline).
- Conduct target plant surveys or baseline assessments for species within this guild (Guideline)..
- Avoid activities that would negatively impact the hydrologic regime of the Sheyenne River and the Sheyenne aquifer (Guideline).

Management Area Direction (Chapter 3)

SNG (MA 3.64)

- Limit all motorized use to administrative use (Standard).
- Maintain disturbance processes if required for habitat enhancement, restoration or species viability (Standard).
- Allow no new road or trail construction except when necessary to correct resource damage occurring from existing sites (Standard).
- Conflicts that cannot be mitigated are resolved in favor of specific plant and wildlife species and communities (Standard).
- Prohibit removal of mineral material (Standard).
- Do not include this management are in any grazing allotment. However, livestock grazing may be used as a tool to achieve desired conditions (Guideline).
- No new utility corridors or additional development within existing corridors will be permitted. Existing corridors may be maintained until they are abandoned (Standard).
- Prohibit new special-use facilities except for valid existing rights (Guideline).

Monitoring Direction (Chapter 4)

SNG

- Monitor populations and habitat.

Biological Determinations, Risk Assessments, and Rationale

SNG (all members of plant group)

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Within this plant group, species have state rankings of S1, S2, S2/S3, and S3 and range from critically imperiled to rare in the State of North Dakota (North Dakota Natural Heritage Program 1999). Known element occurrences range from less than two known populations to 30+ known populations (North Dakota Natural Heritage database 2000). The known populations contain widely varying numbers of individuals within populations.

Some of the species may be palatable for cattle as well as sheep or goats. However, livestock grazing is fairly limited since typically little livestock forage is produced in these woodland habitats. Livestock do use these areas for shade. The primary threat from livestock for these species is from trampling. Lady fern, oak fern, and leathery grapefern would be especially susceptible to trampling.

Habitat enhancement would occur under the proposed management through restoration of varying levels of natural disturbance processes. The levels of prescribed fire within alternative 3 are a positive move towards restoring the fire regime under which these species and their habitats evolved (USDA Forest Service 2000). Alternative 3 provides for no net increase (from current levels) of noxious. The existence and spread of noxious and exotic species are primary threats to the maintenance of high quality tallgrass prairie habitat (USDA Forest Service 2000).

Proposed management activities under all alternatives should provide adequate protection for known populations of species within this group. Populations should remain viable throughout the planning unit, planning area, and range-wide.

Outcome VI is selected as the risk assessment for oakfern, leathery grapefern, broadleaved goldenrod, foxtail sedge and dogberry. Rationale for outcome VI is that these species are known from very limited populations within the vicinity of the planning unit. This will result in strong limitations on interactions among local populations, high potential for genetic isolation, and uncertainty about the species response to climatic stochastic. Habitat enhancement and population augmentation may be required.

Outcome II is selected as risk assessment for northern lady fern. Habitat of suitable quality, quantity, and abundance will be maintained across the planning unit for this species. Some of the known populations of this species are large. Habitat enhancement may be needed, but population augmentation or re-introductions should not be required.

Tallgrass Prairie Choppy Sandhills Guild

Plant species in this guild include:

Beach heather	Purple sandgrass
Frostweed	Wahoo spindle-tree

Table H-6 summarizes species occurrence and status in the planning area. Each of these species is classified as sensitive by Region 1 of the Forest Service.

Guild Description

This plant group includes species found in the various components of the choppy sandhills land type found within the planning area on the Sheyenne National Grassland in eastern North Dakota. This land type consists of mixed grass prairie intermingled with bur oak savanna woodlands. The oak savanna woodland is a predominant vegetative feature in the sandy soils of the Sandhills Region along the Sheyenne River. Sand dunes and sand blowouts are other distinguishing features within this association. Bur oak seral stages such as aspen communities may also be present (Seiler 1973).

The sandhills are a unique geologic area formed by the Sheyenne River delta as it flowed into ancient Lake Agassiz. At one time, glacial Lake Agassiz formed the largest inland fresh water lake in North America. Where major tributaries entered the lake, deltas were built such as the Sheyenne River delta (Seiler 1973). The geologic origins of the sandhills are unique to the planning area as are the association of habitats found here.

Within the Northern Great Plains planning area, the habitat components captured by this group are uncommon and occupy a very small percentage of the total land base (Seiler 1973, ND Parks and Recreation Dept. 1990). Rolling sandy uplands, including sand dunes, that provide habitat on other portions of the planning area may differ in habitat types, soils, and moisture regime from those described for the Sheyenne National Grassland, however these other habitats share the common feature of having sandy soils.

Four species of concern occur in this group. Frostweed is found within the mixed grass component in the upland rolling prairie as well as intermittently in the bur oak habitat (ND Parks and Recreation Dept 1990, Barker et al. 1977). Sandgrass and beach heather are found in the sand dunes and sand blowouts of the choppy sandhills (Seiler 1973, ND Parks and Recreation Dept. 1990), as well as on upland prairie (Barker et al. 1977). The wahoo spindle tree is found in the bur oak habitat type (North Dakota Natural Heritage database 2000) as well as in wooded areas, bluffs, and along streambanks (Great Plains Flora Association 1986). In addition, several other species are known to occur in the bur oak habitat type although they may primarily use other habitat types. This would include the northern lady's fern that has been found in seral aspen communities associated with bur oak savanna (North Dakota Natural Heritage database 2000). Also, dogberry has been found under the hardwood canopy of the bur oak (North Dakota Natural Heritage database 2000).

Much of the choppy sandhills area in North Dakota has been altered extensively since pre-intensive settlement including past utilization as cropland that later returned to native grassland (Burgess 1964, Shunk 1917, Seiler 1973, and Gantt 1980). In the sand dune habitats, the soils have often been stabilized and the sites are affected by grazing and introduced plant species. The bur oak woodlands in this area of North Dakota have been extensively altered and reduced from pre-intensive settlement (Burgess 1964). According to Shunk (1917), bur oak formerly represented very extensive communities consisting of trees of large size. With the incoming of settlers and the scarcity of fuel and lumber, the trees were cut and utilized in a very short time. They were replaced by scrubby groves of oak that often reached only minimal size before they were also utilized for settlement purposes.

Information on Individual Plant Species

Frostweed (Helianthemum bicknellii)

Beach heather (Hudsonia tomentosa)

Purple sandgrass (Triplasis purpurea)

Distribution of frostweed includes Maine south to Georgia, west to Colorado and north to Manitoba. Beach heather distribution includes Newfoundland south to North Carolina, west to Iowa, and north to Alberta. Purple sandgrass is found from Maine south to Florida, west to New Mexico, and north to Ontario. The global rank of frostweed and beach heather is "G5" meaning common, widespread, and abundant (although they may be rare in parts of their range, particularly on the periphery) (NatureServe 2000). The global rank of purple sandgrass is "G4G5" meaning uncommon but not rare, and usually widespread to common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery).

In the planning area, frostweed has been documented from Nebraska, North Dakota, and South Dakota. Beach heather is known only from North Dakota in the planning area. Purple sandgrass has been documented from North Dakota, South Dakota, and Nebraska (NatureServe 2000). In North Dakota, frostweed, beach heather, and purple sandgrass are all known from very few populations. In addition, few individuals occur within these populations. Only two populations of beach heather are known in North Dakota. One of the populations is reported in poor condition and low vigor. Five populations of frostweed are found in North Dakota. Population threats to this species include competition from invasive plant species. Purple sandgrass is known from three populations in North Dakota. Some population sizes are small with one population containing 20 individuals (North Dakota Natural Heritage database 2000).

Wahoo spindle-tree (*Euonymus atropurpurea*)

Distribution of wahoo spindle-tree includes Maine south to Florida, west to Texas, and north to Montana and Ontario. The wahoo spindle-tree is known from 18 populations in North Dakota and is more widespread in Nebraska and South Dakota. The global rank of this species is "G5" meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery) (NatureServe 2000).

Some of the populations are reported to have disturbances from heavy browsing, herbicide spraying, and habitat alteration from logging. Most of the populations are known from very few individuals (less than five plants) although three populations do contain 100 or more plants (North Dakota Natural Heritage database 2000).

Direct and Indirect Effects on NFS Lands

Noxious weeds such as leafy spurge occur in scattered populations throughout the tallgrass prairie. Noxious weeds reduce the quality of sensitive species habitat but at the same time, efforts to control spurge and other invasive species with chemicals can pose a direct threat to sensitive species.

Competition from other non-native invasive plants can be a significant threat. Invasive species such as Kentucky bluegrass and smooth brome often form monocultures, significantly reducing the diversity of native species. Some types of livestock grazing seem to encourage spread of these invasive species while some grazing strategies can reduce rates of encroachment and spread.

Roads can negatively affect sensitive plant populations by introducing non-native plant species along travel routes, through habitat fragmentation, and by loss of suitable habitat to disturbance.

Recreation can have effects on sensitive plants or plant populations, depending on types of recreational use, road and trail use patterns and intensities, rate of spread of invasive, non-native plant species along recreational routes, and other factors.

Increased rates of channelization in drainages can result in lowered water tables. Activities that lower water tables below the root zone of some sensitive plant species may place individual plants or populations at risk.

Burning, livestock grazing, and mowing can have positive or negative effects on sensitive plant species, depending on frequency, intensity, and timing of disturbance and on the life history needs of the individual plant species. Properly timed grazing, burning, and mowing may be beneficial in maintaining the quality of native grassland habitats. Lack of disturbance can cause some sites to convert to shrub habitats or to become dominated by heavy vegetative cover.

Burning may directly impact sensitive plant species by causing mortality or indirectly impact these species and communities through effects on the habitat. Mowing and summer burning may prevent a completion of the life cycle for frostweed. Early spring and late fall burning should have no effect on any of the species and may be beneficial.

Fire suppression can contribute to stabilization and increased vegetative cover on the sandhills, thereby reducing the number and size of blowouts where occupied and potential habitats exist for several species in this group. This would particularly affect sandgrass, an annual species associated with primary succession on blowouts.

Early season livestock grazing can prevent sensitive plants from completing their life cycles and producing seeds. Excessive and continuous livestock grazing on sensitive plants can lead to impacts on plant regrowth, thereby reducing the vigor of plants within the population. The species in this plant group are not considered highly palatable to cattle but could be grazed by sheep or goats.

Grazing can also reduce dead material within plant communities and open up canopy layers of plants allowing for the germination and establishment of new plants. Livestock grazing can create conditions favorable for establishment of new plants of sensitive species such as beach heather and sandgrass that require disturbed areas for germination.

Livestock trampling can be a problem under some circumstances for the sensitive species in this plant group. Trampling could be detrimental to individual plants. In addition, excessive and repeated soil compaction from trampling may result in reduced plant vigor.

Repeated mowing may prevent some sensitive plant species from completing their life cycle and may also reduce carbohydrate reserves. Mowing should have no affect after seed set.

Cumulative Effects

Continued loss of suitable habitat through conversion of rangelands to croplands can be expected to occur on private lands (Ostlie et al. 1997, USDA Forest Service 2000).

It is likely that noxious weeds will remain as threats to the habitats of these species on private and public lands in and around the administrative units containing these species (Ostlie et al. 1997).

Livestock grazing and mowing practices that are unfavorable for the conservation of sensitive plant species are likely to continue on some private lands.

Grazing practices on private land may not be conducive to sustaining populations.

Stabilization of blowouts on private land may continue to decrease populations on private land.

Development activities such as road and building construction on private lands will continue, resulting in some loss of suitable habitat for sensitive plant species and some possible mortality of sensitive plants and population loss.

Drainage ditches on adjacent private land may lower water table levels below the root zone of some sensitive plant species, putting individuals or populations at risk.

Insecticide spraying on adjacent croplands may reduce or threaten insect pollinators for some sensitive plant species (Arenz and Joern 1996, USDA Forest Service 2000).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction under Alternative 3 in the revised LRMP:

Unit-wide Direction (Chapter 1)

SNG

- Avoid placing new facilities and developments such as water tanks and impoundments in habitat occupied by sensitive plant species (Guideline).
- Identify sensitive plant habitats as priorities for noxious weed and invasive plant monitoring and control (Guideline).
- Avoid the use of noxious weed and invasive plant control methods that may negatively impact sensitive plants (Guideline).
- Design timing, intensity, and frequency of mowing, burning and livestock grazing to maintain or increase sensitive plant species populations and the health of rare plant communities (Standard).
- Do not authorize vegetation management and construction projects that would further isolate or prevent re-colonization of sensitive plant populations from adjacent populations (Standard).

SNG, cont.

- Manage for natural disturbance processes when necessary to maintain early seral habitat for these species. Do not initiate stabilization measures for habitats occupied by these species (Standard).
- Ensure that management actions do not contribute to loss of population viability for Forest Service sensitive plant species (Standard).
- Protect known sensitive plant populations from land use activities that cause increased trampling or soil compaction within key habitats (Guideline).
- Enhance and improve habitat for known sensitive plant populations through restoration programs (Guideline).
- Prohibit use of pesticides that would adversely affect species at risk (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

SNG

- Objectives call for specified levels of ungrazed habitat and a more diverse grassland vegetation mosaic through desired levels of rest, seral stages and vegetation structure (see tables in Section 5).
- Use disturbance processes (i.e. grazing, fire) to maintain habitat for dune dependant species (Guideline).
- Conserve rare plant communities through the use of ecological processes suited for those communities (Guideline).
- Develop and initiate implementation of conservation strategies plants within this guild (Guideline).
- Conduct target plant surveys or baseline assessments for species within this guild (Guideline).
- Maintain and enhance suitable occupied and unoccupied early seral habitats such as dunes and blowouts for sensitive plant species habitat (Guideline).

Management Area Direction (Chapter 3)

SNG (MA 2.2 and 3.66)

- The proposed Bear Den / Bur Oak RNA (MA 2.2) provides habitat for this plant guild. RNAs will be managed to protect their ecological values. Management plans will be completed within 5 years (Objective).
- Initiate intensive restoration efforts to meet desired conditions that include active and passive methods.
- Prevent new introductions of non-native plant species into known areas of sensitive plant species or guilds (Guideline).

Monitoring Direction (Chapter 4)

SNG

- Monitor populations and habitat.
- Monitor the effectiveness of the suggested stocking rates in Appendix I in meeting desired vegetation composition and grassland structure levels.

Appendices

SNG

- Appendix I provides suggested stocking rates for various livestock grazing intensities. This appendix is referenced by a standard under geographic area direction (Chapter 2) to use this appendix to help develop and implement range management practices for meeting vegetation objectives.

Biological Determinations, Risk Assessments, and Rationale

SNG (all species in this guild)

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Under Alternative 3, specific mitigation measures have been incorporated into the geographic area and management area direction that will enhance habitat specifically for the species found in this guild. Under Alternative 3, the majority of the habitat in this guild will be managed under 1.31 Backcountry Nonmotorized and 3.66 Ecosystem Restoration management areas. Under 1.31 and geographic area direction, natural disturbances processes such as fire, rest, and grazing will contribute to a mosaic of vegetation composition and structure. Reclamation will also occur in areas of disturbed habitats. Under 3.66 direction, the emphasis will focus upon restoration of plant and animal species and communities with maintenance and restoration of natural disturbance processes.

Under Alternative 3, additional protection would be provided to the habitats in this plant group under the Oak Hills proposed Research Natural Area. A management plan will be developed and implemented for the RNA that will focus upon restoration of the ecological integrity of the vegetation communities of this guild. Another objective of the proposed RNA is the protection of important elements of biodiversity associated with oak communities including rare plant species.

In addition, the proposed levels of prescribed fire are a positive move towards restoring the natural fire regime. For example, frostweed seems to be positively correlated to a periodic fire regime (K. Hansen, personal communication). Alternatives 3 provides for no net increase (from current levels) of noxious weeds. The existence and spread of noxious and exotic species is one of the primary threats to the maintenance of high quality tallgrass prairie habitat (USDA Forest Service 2000). Alternative 3 would provide for 10% to 15% early seral conditions that will contribute to the maintenance of suitable habitat for some of the sensitive species in this group. The proposed reduction in grazing should also help reduce spread of noxious weeds into some areas as well as help reduce livestock trampling of sensitive species.

Outcome VI is selected as the risk assessment for beach heather, sandgrass, and frostweed. Rationale for outcome VI is that these species are known from very limited populations in the vicinity of the planning unit. This will result in strong limitations on interactions among local populations, high potential for genetic isolation, and uncertainty about the species response to climatic stochastic. Habitat enhancement and population augmentation may be required.

Outcome II is selected as the risk assessment for wahoo spindle tree. Habitat of suitable quality, quantity, and abundance will be maintained across the planning unit for this species. Some of the known populations of this species are large. Habitat enhancement may be needed, but population augmentation or re-introductions should not be required.

Western Plains Riparian Guild

Plant species in this guild include:

Lanceleaf cottonwood

Alkali sacaton

Blue lips

Table H-6 summarizes species occurrence and status in the planning area. Each of these species is classified as sensitive by Region 1 of the Forest Service.

Guild Description

This plant group contains species that are found across a wide variety of wetland/riparian habitat types found within the semi-arid mixed grass/shortgrass plains of the planning area. All currently known populations of these species occur on the Little Missouri National Grassland (North Dakota Natural Heritage database 2000). Some of the species within this guild may possibly occur on some of the other planning units. The habitat types of this plant group are areas of added moisture within a semi-arid mixed grass/shortgrass landscape. For example, they include the riparian cottonwood communities found along perennial and intermittent streams, sedge/juncus habitats found in conjunction with springs and seeps, mesic swales, saline subirrigated zones, wooded draws, and wet meadows.

Within the planning area, the habitat components associated with this plant group are uncommon and occupy a very small percentage of the total land base (USDA Forest Service 2000, Finch and Ruggiero 1993). Throughout the planning area, mesic habitat types may differ in vegetation type, soils, and hydrologic regime from those described for the Little Missouri National Grassland. However, these other habitats share the common feature of having a seasonally or perennially wet moisture regime within a semi-arid grassland landscape.

This plant group includes both narrow range and mid-range species (USDA Forest Service 2000). Lanceleaf cottonwood, a narrow range species restricted to a single habitat type, is known in the planning area from riparian zones along perennial creeks in western North Dakota (North Dakota Natural Heritage database 2000, Lenz 1993, Heidel 1990). Alkali sacaton and blue lips have a mid-range of versatility and are found primarily in one habitat type but can be found in other habitat types. Alkali sacaton is found within the subirrigated zone of saline drainageways (Stubbendieck et al. 1997) as well as being found on secondary successional habitat of clay outwashes in Theodore Roosevelt National Park (Heidel 1990). It is also recorded on depositional areas of sandy clay outwashes and alluvial deposits (Lenz 1993).

Blue lip occurs primarily in niches of low evapotranspiration rates, added moisture conditions, and limited sunlight reflectance in the mixed grass prairie (USFS ECODATA database 2000). Riparian areas, mesic swales, wooded draws, north-facing slopes, and escarpments can also provide suitable conditions (North Dakota Natural Heritage database 2000; Lenz 1993; S. Rinehart, personal observation). Other records place the species in upland prairie with rocky soil (Barker et al. 1977), and in grassy hillsides (Zaczkowski 1972).

Wetland and riparian areas within the mixed and shortgrass prairies vary from the "green zones" along rivers and drainageways to flowing springs and seeps. Their habitat types comprise a very small percentage of the total land base in the semi-arid plains and yet riparian habitats contribute disproportionately to the diversity of native vegetation (Finch and Ruggiero 1993). In addition, these riparian plant communities were some of the most heavily altered by historic settlement (Krueper 1994). Demands for water from settlers and livestock grazing resulted in many impacts on riparian plant communities. Hydrologic regimes and riparian vegetation were frequently altered by livestock grazing, roads, logging of cottonwoods, oil and gas, wetland drainage, conversion of riparian areas to cropland, and irrigation practices (Hansen et al. 1988, Krueper 1994). Currently many areas of added moisture faced habitat risk from introduced and noxious plant species.

Information on Individual Plant Species:

Lanceleaf cottonwood (*Populus x acuminata*)

Distribution of lanceleaf cottonwood includes North Dakota south to Texas, west to Arizona, and north to Alberta (NatureServe 2000). The global rank of this species is “Hybrid” meaning it is a hybrid between two species. In this case, lanceleaf cottonwood is a hybrid between *Populus deltoides* and *Populus angustifolia*. The latter species no longer occurs in the locality of the hybrid populations (Great Plains Flora Association 1986).

Within the planning area, this species is found in South Dakota and is considered rare in North Dakota and Nebraska (NatureServe 2000). Lanceleaf cottonwood is known from six populations in North Dakota (North Dakota Natural Heritage database 2000), including two populations on USFS land (Lenz 1993) and a population in Theodore Roosevelt National Park (Heidel 1990). Two of the populations are very small and contain only one tree. The largest population contains 30 trees. All populations contain mature individuals primarily. Regeneration is occurring at only one site and is very limited (North Dakota Natural Heritage database 2000; USFS ECODATA database 2000; S. Rinehart, personal observation). Threats to the populations are from habitat alteration, livestock browsing on cottonwood seedlings, and competition from non-native plant species (North Dakota Natural Heritage database 2000, Lenz 1993). Livestock use cottonwood groves for shade during the hot times of the year.

Blue lips (*Collinsia parviflora*)

The distribution of this species includes Ontario, south through North Dakota, Nebraska, and New Mexico, west to California, and north to Alaska. The global rank of this species is “G5,” meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery) (NatureServe 2000). Within the planning area, blue lip is found on periphery of its range.

Blue lips is known from seven populations in North Dakota (North Dakota Natural Heritage database 2000). Most of the populations are known from few individuals (20-30 plants) although one large population on the Little Missouri National Grassland contains several thousand plants (North Dakota Natural Heritage database 2000, Lenz 1993). Threats are livestock grazing, trampling, and trailing, and non-native plant species (North Dakota Natural Heritage database 2000; USFS ECODATA database 2000; Lenz 1993). A high buildup of litter may also be a threat to this species. The known populations occur on both USFS land (four populations) and private land.

Alkali sacaton (*Sporobolus airoides*)

Distribution of alkali sacaton includes North Dakota south to Missouri, Arkansas, and Texas, west to California, north to British Columbia, as well as outlying occurrences in New York and South Carolina (NatureServe 2000). The global rank of this species is "G5," meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery).

Within the planning area, alkali sacaton is on the edge of its range in North Dakota, where it is known from 12 populations (North Dakota Natural Heritage database 2000). Populations in North Dakota vary in size with the majority being fairly small (6 to 20 plants) although two of the populations contain several hundred individuals. Threats to the species include livestock grazing, trampling, competition from invasive plant species, and habitat alteration (North Dakota Natural Heritage database 2000; USFS ECODATA database 2000; S. Rinehart, personal observation). In North Dakota, four of the populations occur on USFS land and another five populations are found within Theodore Roosevelt National Park (North Dakota Natural Heritage database 2000, Heidel 1990).

In other parts of the planning area, alkali sacaton is known from limited occurrences in South Dakota, although it is more plentiful in Nebraska and Wyoming (Great Plains Flora Association 1977). It was described as uncommon during floristic surveys on the Oglala National Grasslands (Rolfsmeier 1996).

Direct and Indirect Effects on NFS Lands

Properly functioning riparian systems provide conditions favorable for establishment and maintenance of riparian-dependent species. Lanceleaf cottonwood species, in particular, depend upon flooding events, channel meander processes, and exposed mineral soil for establishment.

Management activities can cause a loss of equilibrium within riparian systems resulting in excessive flooding events along drainageways, excessive erosion, sedimentation, and/or channelization. This may reduce habitat for sensitive plant species in this group. Excessive removal of vegetation on uplands can result in rill, sheet, and gully erosion and excessive soil and water runoff. Increased rates of channelization can result in lowered water tables. Lanceleaf cottonwood can be come pedestaled by excessive rates of erosion with riparian channels. Alkali sacaton populations can be adversely affected by a lowering of the table within subirrigated habitat. Any activities that lower water tables below the root zone of sensitive plant species place individual plants or populations at risk.

Development of springs and seeps for livestock water can result in loss of sensitive species populations and loss of specialized habitat. Many springs have been developed in the past for livestock and the net loss of these habitat types is very high in many parts of the Grasslands.

Competition from non-native invasive plants can be a significant threat. Invasive species such as Kentucky bluegrass and smooth brome often form monocultures within riparian habitats, significantly reducing the diversity of native species.

Noxious weeds such as leafy spurge and Canadian thistle prefer riparian habitats and areas of added moisture. Noxious weeds reduce the quality of sensitive species habitat but at the same time, efforts to control spurge and other invasive species with chemicals can pose a direct threat to sensitive species. In addition, many chemicals are restricted for use within riparian zones.

Ground-disturbing activities associated with oil, gas, mineral, and other types of development could result in mortality of sensitive plants or place their populations at risk.

Roads can negatively affect sensitive plant populations by introducing non-native plant species along travel routes, through habitat fragmentation, and by loss of suitable habitat to disturbance.

Recreation can have effects on sensitive plants or plant populations, depending on types of recreational use, road and trail use patterns and intensities, rate of spread of invasive, non-native plant species along recreational routes, and other factors.

Grasshopper spraying has the potential to impact insect pollinator populations. Information is lacking about specific pollinators for many sensitive plant species.

Burning and livestock grazing can have positive or negative effects on sensitive plant species, depending on frequency, intensity, and timing of disturbance and on the life history characteristics of the individual plant species.

Burning may directly impact sensitive plant species by causing mortality or indirectly impact these species and communities through effects on the habitat. Burning may indirectly affect habitat for blue lips by removing shade and cover, and reducing moisture conditions needed for survival.

Livestock grazing within riparian areas can interfere with reproduction of sensitive plant species such as blue lips and alkali sacaton that reproduce by seed. Excessive livestock grazing in riparian areas can lead to livestock browsing of lanceleaf cottonwood seedlings and saplings, thereby reducing the recruitment of younger trees within the population.

Grazing can reduce dead material in plants and open up canopy layers of plants, allowing for the germination and establishment of new plants.

Livestock trampling in riparian areas and repeated visits to these areas for water can be a problem under some circumstances for some of the sensitive species within this group. Excessive and repeated soil compaction may result in reduced plant vigor. Individual plants may be directly affected by trampling.

Repeated mowing may prevent some sensitive plant species from completing their life cycle and may also reduce carbohydrate reserves.

Cumulative Effects

Continued loss of suitable habitat through conversion of rangelands to croplands can be expected to occur on private lands (Ostlie et al. 1997, USDA Forest Service 2000).

It is likely that noxious weeds will remain as threats in the habitats of these species on private and public lands in and around administrative units containing these species (Ostlie et al. 1997).

Development activities such as road and building construction on private lands will continue, resulting in some loss of suitable habitat for sensitive plant species and some possible mortality of sensitive plants and population loss.

Livestock grazing and mowing practices that are unfavorable for the conservation of sensitive plant species are likely to continue on some private lands (Ostlie et al. 1997).

Insecticide spraying on adjacent croplands may reduce or threaten insect pollinators for some sensitive plant species (Arenz and Joern 1996, Ostlie et al. 1997).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development and additional roads, traffic and pipelines.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction under Alternative 3 in the revised LRMP:

Unit-wide Direction (Chapter 1)

LMNG, GR/CRNG, BGNG, ONG, TBNG

- Design and implement livestock grazing strategies to provide for thick and brushy understories and multi-story and multi-age structure in riparian habitats, wooded draws, and woody thickets, contingent on local site potential (Guideline).
- Manage livestock grazing to maintain or improve riparian / woody draw areas (Guideline).
- Implement management practices that will move at least 80% of riparian and wooded draw areas toward self-perpetuating tree and shrub regeneration (Objective).
- Conduct actions so that habitats are maintained or improved toward robust stream health (Standard).
- Manage land treatments to conserve site moisture and to protect long-term stream, wetland, and riparian health from damage by increased runoff (Standard).
- Allow only those actions next to perennial and intermittent streams, seeps, springs, lakes, and wetlands that maintain or improve long-term proper functioning of riparian ecosystem conditions (Standard).
- Design activities to protect and manage the riparian ecosystem and maintain the integrity of the ecosystem (Standard).

- Maintain and protect hydrologic regimes (Standard).
- To provide protection for riparian areas, locate activities and facilities outside the riparian areas unless alternatives have been assessed and determined to be more environmentally damaging (Guideline).
- Do not deposit waste material below high water lines, in riparian areas, in areas immediately adjacent to riparian areas, or in natural drainage-ways (Guideline).
- Sustain wetland ecological functions and meet regulations found in Section 404(b)(1) of the Clean Water Act (Standard).

LMNG, GR/CRNG

- Avoid placing new facilities and developments such as water tanks and impoundments in habitat occupied by sensitive plant species (Guideline).
- Identify sensitive plant habitats as priorities for noxious weed and invasive plant monitoring and control (Guideline).
- Avoid the use of noxious weed and invasive plant control methods that may negatively impact sensitive plants (Guideline).
- Design timing, intensity, and frequency of mowing, burning and livestock grazing to maintain or increase sensitive plant species (Standard).
- Do not authorize vegetation management and construction projects that would further isolate or prevent re-colonization of sensitive plant populations from adjacent populations (Standard).
- Maintain hydrological regimes and protect and restore developed springs and seeps where habitat for sensitive plant species would be enhanced (Guideline).
- Ensure that management actions do not contribute to loss of population viability for Forest Service sensitive plant species (Standard).
- Protect known sensitive plant populations from land use activities that cause increased trampling or soil compaction within key habitats (Guideline).
- Enhance and improve habitat for known sensitive plant populations through restoration programs (Guideline).
- Prohibit use of pesticides that would adversely affect species at risk (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

LMNG, GR/CRNG

- Complete and implement a conservation strategy for sensitive plants within this guild (Guideline).
- Conduct target surveys or baseline assessments for high priority species within this guild (Guideline).

Management Area Direction (Chapter 3)

LMNG (MA 2.1 – Pretty Butte Special Interest Area)

- The proposed Pretty Butte Special Interest Area (MA 2.1) includes a population of blue lips. Management for unique resources and values, including plant and animal species viability, is prioritized in these areas.
- Allow uses and activities that maintain and enhance the characteristics for which the SIA was designated (Standard).
- Complete site-specific plans for managing the area prior to promoting public visits to a SIA or making significant changes to its land management (Standard).
- Restore natural ecological processes when needed to maintain or enhance the habitats or features for which the SIA was designated (Guideline).
- Reclaim disturbed lands to a condition suitable for the purposes for which the SIA was identified (Standard).
- Develop and initiate implementation of management plans for Pretty Butte SIA (Guideline).
- No ground disturbing mineral activities are permitted; however, existing valid rights will be honored (Standard).
- Prohibit removal of mineral material (Standard).
- Prohibit OHV trail construction (Standard).
- Existing utility corridors may be maintained until they are abandoned. New utility corridors or additional development within existing corridors will be permitted only where associated with valid existing rights (Standard).
- Prohibit new special-use facilities except for valid existing rights (Guideline).

Monitoring Direction (Chapter 4)

LMNG, GR/CRNG

- Monitor populations and habitat.

LMNG, GR/CRNG, BGNG, ONG, TBNG

- Monitor the extent that riparian area vegetation is regenerating.

Biological Determinations, Risk Assessments, and Rationale

LMNG (all species in this plant group)

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Alternative 3 would restore fire, rest, and herbivory as natural ecological processes to varying levels. Species within this plant group need habitat conditions that include both early and mid-high seral conditions for establishment, maintenance, and survival. Alternative 3 would provide for a greater mosaic of habitat conditions across the landscape. The acres of rangeland annually rested from livestock grazing under Alternatives 3 also more closely approximate the conditions under which the species evolved as compared to current grazing conditions (USDA

Forest Service 2000). In addition, the levels of prescribed fire within Alternative 3 are a positive move towards restoring the natural fire regime. Alternatives 3 also provides for no net increase (from current levels) of noxious weeds, combined with decreases in grazing levels. The spread of noxious and exotic species is one of the primary threats to the maintenance of high quality native grassland riparian habitat (USDA Forest Service 2000).

One population of blue lips is protected within the proposed Pretty Butte Special Interest Area under Alternative 3.

Outcome VI is selected as the risk assessment for lanceleaf cottonwood. Rationale for outcome VI is that this species is known from very limited populations within the vicinity of the planning unit. The parent species of this hybrid no longer occurs within the vicinity of known populations. Only limited regeneration will occur. Habitat enhancement and population augmentation may be required.

Outcome II is selected as the risk assessment for blue lips and alkali sacaton. Habitat of suitable quality, quantity, and abundance will be maintained across the planning unit for this species. Some of the known populations of this species are large. Habitat enhancement may be needed, but population augmentation or re-introductions should not be required.

GR/CRNG

Determination is “no impact”. The species presence on this area has not been confirmed and documented. However, management direction is provided for this species and potential habitat on these areas. If the species presence had been confirmed, the determination would have been "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

BGNG, ONG, TBNG

Biological determinations are not made for these species on these areas since they are not listed as sensitive by Region 2 of the Forest Service. The conservation measures listed above are expected to enhance their habitat and / or protect the habitat and species from possible adverse effects of Forest Service authorized activities and allocations.

Sandy Guild

Plant species in this guild include:

Sand lily

Nodding buckwheat.

Upright pinweed and smooth goosefoot would also be considered members of this plant group. However, they were evaluated as individual species.

Table H-6 summarizes species occurrence and status in the planning area. Both of these species are classified as sensitive by Region 1 of the Forest Service.

Guild Description

This plant group includes species known from areas of sandy soils such as sand dunes, sand swales, sand blowouts, sandy terraces, and decomposing sandstone outcrops. These areas can often be characterized by low vegetative cover. Many times they are nutrient poor and contain poorly developed soil horizons. Some sites contain sandstone parent material occurring in various stages of decomposition. Sandstone may occur as fractured rock layers or it can be decomposed sand over sandy clay loam. All of the habitats are highly erosive by wind and water. These specialized habitats occur in limited quantity across the landscape, although they are widely dispersed in the mixed and shortgrass plains of the planning area. The sand influenced areas often represent microsites within the surrounding landscape.

More of these sandy habitats may have been available in early seral conditions prior to settlement (Smith and Bradley 1990). Ecological processes such as fire, rest, and herbivory patterns, and the combinations of these processes, may have combined to create more areas of active sand blowouts and open sandy swales (USDA Forest Service 2000, Smith and Bradley 1990). Stabilization of sandy soils results in loss of habitat for many of the members of this plant group.

Most of the known populations of these species occur on the Little Missouri National Grassland. Nodding buckwheat is a narrow range specialist found in soils dominated by sandy parent material in the upper horizon (Great Plains Flora Association 1986, Stephens 1963, L.Spencer personal communication). Sand lily is a mid-range specialist, found primarily in sandy soils, although it may also be found in mixed sandy loam soils and soils with a more developed soil horizon (Great Plains Flora Association 1986; North Dakota Natural Heritage database 2000; Barker et al. 1977; L. Spencer, personal communication).

Information on Individual Plant Species:

Sand lily (*Leucorinum montanum*)

Distribution of sand lily includes North Dakota south to Nebraska and New Mexico, west to California and north through Oregon and Montana (NatureServe 2000). The global rank of this species is “G5”, meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Within the planning area, sand lily is known from western South Dakota, western and central Nebraska and the very southeastern edge of Wyoming. It may possibly occur on clay pan sites on the Oglala (Rolfsmeier 1996), Grand River / Cedar River, Thunder Basin, and Buffalo Gap National Grasslands.

It is a low growing perennial with deeply buried rootstocks (Great Plains Flora Association 1986). Sand lily is an early flowering species generally blooming in May.

This species is known in North Dakota from six populations (North Dakota Natural Heritage database 2000). However, several records are historical. Attempts to relocate several of the populations have not been successful (U.S Forest Service files, Medora Ranger District; S. Rinehart, personal observation). Population size varies from one individual to 20 individuals (North Dakota Natural Heritage database 2000). Only one population is known from USFS lands and it has not been re-located, despite annual monitoring (U.S. Forest Service files, Medora Ranger District).

Nodding buckwheat (*Eriogonum cernuum*)

Nodding buckwheat distribution includes Saskatchewan south through Nebraska to New Mexico, west to California, and north to Alberta (NatureServe 2000). The global rank of this species is "G5," meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Within the planning area, nodding buckwheat is found in extreme western North Dakota and South Dakota, western Nebraska, and limited distribution in eastern Wyoming (Great Plains Flora Association 1977).

It is another early to mid blooming species, and is associated with decomposing sandstone outcrops (North Dakota Natural Heritage database 2000; USFS ECODATA database 2000; Lenz 1993). In North Dakota, nodding buckwheat is known from three populations (North Dakota Natural Heritage database 2000). Two populations are found on USFS land in the Little Missouri National Grassland and one population is found on private land. Population size varies from approximately 20 individuals to 50 individuals (North Dakota Natural Heritage database 2000). The habitat upon which these species depends is fragile and has a low tolerance to disturbance (North Dakota Natural Heritage database 2000; S. Rinehart, personal observation). Threats include competition from non-native plant species and livestock trampling (North Dakota Natural Heritage database 2000).

The North Dakota Natural Heritage Program has identified potential viability concerns for nodding buckwheat (Lenz 1993) based upon the few known populations and small size of known populations.

Direct and Indirect Effects on NFS Lands

Lack of natural processes such as fire, grazing and rest, and combinations of these processes, can reduce the available habitat for species in this plant group, resulting in the stabilization of sand dunes and mature vegetative cover on areas of sandy soils.

Competition from non-native invasive plants is one of the primary threats to the species in this plant group. Invasive species are spread by vehicles along road corridors and by OHVs, vehicles, and livestock in the backcountry.

Noxious weeds such as leafy spurge and Canadian thistle occur in scattered populations throughout the mixed grass and shortgrass plains. Noxious weeds reduce the quality of sensitive species habitat but at the same time, efforts to control spurge and other invasive species with chemicals can pose a direct threat to sensitive species.

Roads can negatively affect sensitive plant populations by introducing non-native plant species along travel routes, through habitat fragmentation, and by loss of suitable habitat to disturbance.

Ground-disturbing activities associated with oil and gas development, mineral exploration, and scoria pits could result in mortality of sensitive plants or place their populations at risk.

Recreation can have effects on sensitive plants or plant populations, depending on types of recreational use, road and trail use patterns and intensities, rate of spread of invasive, non-native plant species along recreational routes, and other factors.

Burning and livestock grazing can have positive or negative effects on sensitive plant species, depending on frequency, intensity, and timing of disturbance and on the life history characteristics of the individual plant species. Burning may directly impact the species by causing mortality or indirectly through modification of its habitat.

Grazing can reduce dead material within plant communities and open up canopy layers of plants, allowing for the germination and establishment of new plants. Excessive livestock grazing can interfere with reproduction of sand lily. Sand lily is considered palatable to livestock. Early season grazing can impact plant growth and flowering during its most vulnerable period.

Livestock trampling during wet times of year can be a problem under some circumstances. Excessive and repeated soil compaction may result in reduced plant vigor for the sand lily. Individual plants may be damaged by trampling.

Excessive removal of vegetation on uplands can result in rill, sheet, and gully erosion and excessive soil and water runoff. Increased erosion can result in lowered water tables. Any activities that lower water tables below the root zone of sensitive plant species may place individual plants or populations at risk.

Grasshopper spraying has the potential to impact insect pollinator populations. Information is lacking about specific pollinators for this sensitive plant species, however it is suspected to be insect pollinated.

Cumulative Effects

It is likely that noxious weeds will remain as threats in the habitats of these species on private and public lands in and around NFS lands containing these species (Ostlie et al. 1997).

Development activities such as road and building construction on private lands will continue, resulting in some loss of suitable habitat for sensitive plant species and some possible mortality of sensitive plants and population loss.

Livestock grazing practices that are unfavorable for the conservation of sensitive plant species are likely to continue on some private lands.

Continued loss of suitable habitat through conversion of rangelands to croplands can be expected to occur on private lands (Ostlie et al. 1997, USDA Forest Service 2000).

Insecticide spraying on adjacent croplands may reduce or threaten insect pollinators for some sensitive plant species (Arenz and Joern 1996, Ostlie et al. 1997).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development and additional roads, traffic and pipelines.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction under Alternative 3 in the revised LRMP:

Unit-wide Direction (Chapter 1)

LMNG

- Avoid placing new facilities and developments such as water tanks and impoundments in habitat occupied by sensitive plant species (Guideline).
- Identify sensitive plant habitats as priorities for noxious weed and invasive plant monitoring and control (Guideline).
- Avoid the use of noxious weed and invasive plant control methods that may negatively impact sensitive plants (Guideline).
- Design timing, intensity, and frequency of mowing, burning and livestock grazing to maintain or increase sensitive plant species populations and the health of rare plant communities (Standard).
- Do not authorize vegetation management and construction projects that would further isolate or prevent re-colonization of sensitive plant populations (Standard).
- Manage for natural disturbance processes when necessary to maintain early seral habitat. Do not initiate stabilization measures for these habitats (Standard).
- Ensure that management actions do not contribute to loss of population viability for Forest Service sensitive plant species (Standard).
- Protect known sensitive plant populations from land use activities that cause increased trampling or soil compaction within key habitats (Guideline).
- Enhance and improve habitat for known sensitive plant populations through restoration programs (Guideline).
- Prohibit use of pesticides that would adversely affect species at risk (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

GRNG, LMNG

- Complete and implement a conservation strategy for sensitive plants within this guild (Guideline).
- Conduct target surveys or baseline assessments for high priority species within this guild (Guideline).
- Control the timing of livestock grazing in riparian areas and on sandy soils to protect known sand lily populations (Guideline).

Management Area Direction (Chapter 3)

LMNG (MA 2.1 – Round Top Butte Special Interest Area)

- The Roundtop Butte Special Interest Area (MA 2.1) includes one of the two known populations of nodding buckwheat that occur on this national grassland. This area was allocated to help protect and conserve the unique botanical resources on this national grassland.

LMNG (MA 2.1 – Round Top Butte Special Interest Area), cont.

- Allow uses and activities that maintain and enhance the characteristics for which the SIA was designated (Standard).
- Complete site-specific plans for managing the area prior to promoting public visits to a SIA or making significant changes to its land management (Standard).
- Restore natural ecological processes when needed to maintain or enhance the habitats or features for which the SIA was designated (Guideline).
- Reclaim disturbed lands to a condition suitable for the purposes for which the SIA was identified (Standard).
- Develop and initiate implementation of management plans for Round Top Butte SIA (Guideline).
- No ground disturbing mineral activities are permitted; however, existing valid rights will be honored (Standard).
- Prohibit removal of mineral material (Standard).
- Prohibit OHV trail construction (Standard).
- Existing utility corridors may be maintained until they are abandoned. New utility corridors or additional development within existing corridors will be permitted only where associated with valid existing rights (Standard).
- Prohibit new special-use facilities except for valid existing rights (Guideline).

Monitoring Direction (Chapter 4)

- Monitor populations and habitat.

Biological Determinations, Risk Assessments, and Rationale

LMNG

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Alternative 3 would restore fire, rest, and herbivory as natural ecological processes to varying levels and provide for a greater mosaic of habitat conditions across the landscape. The acres of rangeland annually rested from livestock grazing under these alternatives also more closely approximates the conditions under which the species evolved as compared to current grazing conditions (USDA Forest Service 2000). In addition, the levels of prescribed fire within Alternatives 3 are a positive move towards restoring the natural fire regime. Alternatives 3 also provides for no net increase (from current levels) of noxious weeds, combined with decreases in grazing levels. The spread of noxious and exotic species is one of the primary threats to the maintenance of high quality native grassland habitat (USDA Forest Service 2000).

Alternative 3 provides Special Interest Area (SIA) designation for Roundtop Butte that contains one of the two known populations of nodding buckwheat within the Little Missouri National Grassland. A management plan will be developed and implemented under Alternative 3 for the SIA, providing another level of management to enhance protection for this species.

Outcome VI is selected as the risk assessment for nodding buckwheat and sand lily. These species are known from very limited populations in the planning unit. This will result in strong limitations on interactions among local populations, high potential for genetic isolation, and uncertainty about the species response to climatic stochasticity. Habitat enhancement and population augmentation may be required.

Scoria Hills Guild

Plant species in this guild include:

Golden stickleaf

Limber pine

Table H-6 summarizes species occurrence and status in the planning area. Both of these species are classified as sensitive by Region 1 of the Forest Service.

Guild Description

This plant group includes species that occupy scoria hills, scoria knobs, and rocky outcrops. This habitat provides specialized niches within the surrounding landscape. Scoria hills and rock outcrops may be locally common yet widely dispersed across the mixed and shortgrass plains in the western portion of the planning area. The plant associations included with these habitats are predominately graminoids such as needlegrass and wheatgrass with a diverse forb community that is often very different from the forb mix in the surrounding landscape.

Two plant species, including one conifer and a forb, are associated with these scoria sites. Golden stickleaf is a narrow-range species while limber pine occurs in the mid-range of versatility, i.e. it is associated primarily with one habitat type but may also be found in other habitat types. Golden stickleaf is found on scoria breaks and rocky knobs in the mixed grass plains of western North Dakota (Great Plains Flora Association 1986, North Dakota Natural Heritage database 2000). Limber pine is found in scoria hills and dry hilltops above the Little Missouri River in North Dakota (North Dakota Natural Heritage database 2000, Barker et al. 1977).

These scoria hills and knobs represent microsites within the rolling grasslands and badlands. Some components of their plant communities may be similar to surrounding communities. However, the lithic soil horizon often favors droughty species, early seral species, and occasionally a shrub or tree species that may establish roots into rocky soil profile. These microsites are not defined by sandy or silty soils but by stony / gravelly rock fragments in the upper soil horizon and fine to medium textured soils (L.Spencer, personal communication).

The mixed grass plains surrounding these microsites evolved under a broad scale disturbance regime of herbivory, fire, and climatic fluctuations (USDA Forest Service 2000). Although Wright and Bailey (1980) describe climate as the dominant factor controlling the vegetation composition of North American grasslands, fire regimes and herbivory patterns have been the two processes most altered since settlement of the prairies. The periodic fires shaped the vegetation landscape and removed both green and dead plant material. In semi-arid regions, big prairie fires in the past usually occurred during drought years that followed one to three years of above-average precipitation that provided abundant and continuous fuel (Wright and Bailey 1980).

Information on Individual Plant Species:

Limber pine (*Pinus flexilis*)

Distribution of limber pine includes North Dakota south to Nebraska and New Mexico, west to California, and north to British Columbia. In the planning area, limber pine is rare in Nebraska, South Dakota, and North Dakota. It is more common in Wyoming (NatureServe 2000). The global rank of this species is "G5," meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery).

Limber pine is known from one population in North Dakota (North Dakota Natural Heritage database 2000). The population is large and self-regenerating (USFS ECODATA database 2000). Habitat includes slopes and summits of eroded scoria hills and scoria capped rocky ridges (Zaczkowski 1972, Lenz 1993). Most of the population occurs on USFS land. Threats to the species are prim4arily from porcupine damage (North Dakota Natural Heritage database 2000, USFS ECODATA database 2000).

Golden stickleaf (*Mentzelia pumila*)

Golden stickleaf distribution includes North Dakota south through Wyoming to Texas, west to Arizona, and north through Nevada, Utah, and Montana. The global rank of this species is "G4" meaning uncommon but not rare (although it may be rare in parts of its range, particularly on the periphery), and usually widespread. It is apparently not vulnerable in most of its range, but possibly cause for long-term concern (NatureServe 2000).

In the planning area, golden stickleaf is known from two populations in North Dakota (North Dakota Natural Heritage database 2000). Both populations are found on USFS land in the limber pine area of the Little Missouri National Grassland. Threats to habitat include trampling from livestock and invasive, non-native plants. Both populations contain few individuals.

Direct and Indirect Effects on NFS Lands

Primary threats to the limber pine population are from porcupine foraging that often kills individual trees by stripping the trunks of bark. Limber pine is also susceptible to the blister rust and an outbreak of this disease in this area may seriously impact the pine community. The alternate host for blister rust, *Ribes* spp., also occurs in this area.

Competition from non-native invasive plants can be a threat in reducing the diversity of native species.

Noxious weeds such as leafy spurge and Canadian thistle occur in scattered populations throughout the mixed grass plains. Noxious weeds reduce the quality of habitat but at the same time, efforts to control spurge and other invasive species with chemicals can pose a direct threat to sensitive species.

Burning and livestock grazing can have positive or negative effects on sensitive plant species depending on frequency, intensity, and timing of disturbance and on the reproductive characteristics of the individual plant species.

Burning may cause species mortality or indirectly impact species habitat. Burning would affect limber pine by causing tree mortality.

Grazing can reduce dead material within plant communities and open up canopy layers of plants, allowing for the germination and establishment of new plants. Neither of the species is considered palatable to livestock.

Livestock trampling during wet times of year can be a problem under some circumstances for golden stickleaf. Excessive and repeated soil compaction may result in reduced plant vigor. Individual plants may be directly affected by trampling.

Grasshopper spraying has the potential to impact insect pollinator populations (Arenz and Joern 1996). This may be of concern for golden stickleaf where information is lacking about specific pollinators.

Ground-disturbing activities associated with oil, gas, mineral, and other types of development could result in mortality of sensitive plants or place their populations at risk.

Roads can negatively affect sensitive plant populations by introducing non-native plant species along travel routes, through habitat fragmentation, and by loss of suitable habitat to disturbance.

Recreation can have effects on sensitive plants or plant populations, depending on types of recreational use, road and trail use patterns and intensities, rate of spread of non-native plant species along recreational routes, and other factors.

Cumulative Effects

Continued loss of suitable habitat through conversion of rangelands to croplands can be expected to occur on private lands within the planning area (Ostlie et al. 1997, USDA Forest Service 2000).

It is likely that noxious weeds will remain as threats in the habitats of these species on private and public lands in and around NFS lands (Ostlie et al. 1997).

Development activities such as road and building construction on private lands will continue, resulting in some loss of suitable habitat for sensitive plant species and some possible mortality of sensitive plants and population loss.

Livestock grazing practices that are unfavorable for the conservation of sensitive plant species are likely to continue on some private lands.

Insecticide spraying on adjacent croplands may reduce or threaten insect pollinators for some sensitive plant species (Arenz and Joern 1996, Ostlie et al. 1997).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development and additional roads, traffic and pipelines.

Wilderness designations may reduce the opportunity to prescribe burn specifically for enhancing sensitive plant species habitat.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction under Alternative 3 in the revised LRMP:

Unit-wide Direction (Chapter 1)

LMNG

- Avoid placing new facilities and developments such as water tanks and impoundments, in habitat occupied by sensitive plant species (Guideline).
- Identify sensitive plant habitats as priorities for noxious weed and invasive plant monitoring and control (Guideline).
- Avoid the use of noxious weed and invasive plant control methods that may negatively impact sensitive plants (Guideline).
- Design timing, intensity, and frequency of mowing, burning and livestock grazing to maintain or increase sensitive plant species populations and the health of rare plant communities (Standard).
- Do not authorize vegetation management and construction projects that would further isolate or prevent re-colonization of sensitive plant populations (Standard).
- Ensure that management actions do not contribute to loss of population viability for Forest Service sensitive plant species (Standard).
- Protect known sensitive plant populations from land use activities that cause increased trampling or soil compaction within key habitats (Guideline).
- Enhance and improve habitat for known sensitive plant populations through restoration programs (Guideline).
- Prohibit use of pesticides that would adversely affect species at risk (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

LMNG

- Complete and implement a conservation strategy for sensitive plants within this guild (Guideline).
- Conduct target surveys or baseline assessments for high priority species within this guild (Guideline).

Management Area Direction (Chapter 3)

- None

Monitoring Direction (Chapter 4)

LMNG

- Monitor populations.

Biological Determinations, Risk Assessments, and Rationale

LMNG

Determination is "may adversely impact individuals, but not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide." Both limber pine and golden stickleaf are ranked as S1 species by the State of North Dakota, meaning they are critically imperiled in the state because of extreme rarity (North Dakota Natural Heritage Program 1999).

Under the alternative, both species are protected within the Limber Pine Research Natural Area established in 1991. Specific management protections will be provided by the RNA management plan that will be completed within five years of implementation of the Dakota Prairie Grassland Plan. Annual monitoring of the limber pine population may be needed until the RNA plan is developed and implemented to address potential disease and predation problems.

The spread of noxious and exotic species is one of the primary threats to the maintenance of this habitat within the mixed grass plains (USDA Forest Service 2000). Alternative 3 provides for no net increase (from current levels) of noxious weeds. The acres of rangeland annually rested from livestock grazing under Alternatives 3 more closely approximate the conditions under which golden stickleaf evolved as compared to current grazing conditions (USDA Forest Service 2000). In addition, the levels of prescribed fire within Alternative 3 are a positive move towards restoring the natural fire regime.

Under the management activities proposed by these alternatives and the protection offered known populations through Research Natural Area status, population viability should be met for these two species.

Outcome II is selected as the risk assessment for limber pine. Habitat of suitable quality, quantity, and abundance will be maintained across the planning unit for this species. Habitat enhancement may be needed, however, population augmentation or re-introductions should not be required.

Outcome VI is selected as the risk assessment for golden stickleaf. Stickleaf is known from very limited populations in the vicinity of the planning unit. This will result in strong limitations on interactions among local populations, high potential for genetic isolation, and uncertainty about the species response to climatic stochasticity. Population augmentation may be required. Noxious weeds and exotics are not a threat however.

Buttes Guild

Plant species in this guild include:

Hooker's townsendia

Alyssum-leaved phlox

Torrey's cryptantha

Table H-6 summarizes species occurrence and status in the planning area. Each of these species is classified as sensitive by Region 1 of the Forest Service.

Guild Description

All currently known populations of the forb species in this group occur on the Little Missouri National Grassland (North Dakota Natural Heritage database 2000). Torrey's cryptantha and Hooker's townsendia are narrow range specialists on the Little Missouri National Grassland and are currently found growing on butte landforms and rocky ridges. Alyssum-leaved phlox is also associated with butte landforms but has limited occurrences in other habitats adjacent to buttes (North Dakota Natural Heritage database 2000). Hooker's townsendia is also found near the Buffalo Gap National Grassland.

Butte landforms occur as isolated and scattered topographic features within the surrounding landscape of rolling grasslands and badlands (Murphy et al. 1993). The buttes often contain elements of unique habitat different from habitat more commonly found in the surrounding grasslands. Buttes provide a diversity of specialized niche habitats such as rock cliffs, riparian springs and seeps, rock screen fields, and rimrock ledges. In addition, many of the buttes are capped by geologic formations uncommon for the area. Many of the buttes in North Dakota contain representative examples of the Chadron, Brule, and Arikaree formations that are more commonly found in Nebraska, Wyoming, Colorado, and South Dakota (Murphy et al. 1993). These geologic formations contain unusual edaphic conditions and topographic features contributing to the diversity of plant species and unique plant communities.

Butte landforms on the Little Missouri National Grassland are primarily found in the southern portion of the Grassland and include Black Butte, Bullion Butte, Pretty Butte, Square Butte, and Roundtop Butte.

Information on Individual Plant Species:

Torrey's cryptantha (*Cryptantha torreyana*)

Distribution of Torrey's cryptantha includes North Dakota south and west through Wyoming, Utah, and California, and north to Alaska. The global rank of this species is "G5," meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). In the planning area, this species is rare in North Dakota and Wyoming and has not been documented from South Dakota or Nebraska (NatureServe 2000).

Torrey's cryptantha is known from two populations in the Little Missouri National Grassland (North Dakota Natural Heritage database 2000). One of the populations is known from two individuals. The other population is has persisted and been observed over a 25 year period (North Dakota Natural Heritage database 2000) and occurs in a rock habitat with little associated vegetative cover. Other records place the species on scoria buttes (Barker et al. 1977).

Alyssum-leaved phlox (*Phlox aalyssifolia*)

Alyssum-leaved phlox distribution includes Saskatchewan south through Nebraska, west to Wyoming, and north to British Columbia. The global rank of this species is "G5", meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery) (NatureServe 2000). In the planning area, it is rare in North Dakota and Wyoming and has been reported from Nebraska and South Dakota.

It is known from seven populations in North Dakota with several populations found on the Little Missouri National Grassland. Population sizes vary from 50 to several hundred individuals. Habitat includes the rimrock on top of Bullion Butte and gravelly / pebbly ridge tops (North Dakota Natural Heritage database 2000), although it is also reported from upland prairie (Barker et al. 1977).

Hooker's townsendia (*Townsendia hookeri*)

Hooker's townsendia distribution includes Saskatchewan south through Nebraska, west to Utah, and north to Alaska. The global rank of this species is "G5," meaning common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). This species is considered rare in each state of the planning area (NatureServe 2000).

It is known from three populations in North Dakota, all from the Little Missouri National Grassland (North Dakota Natural Heritage database 2000). Populations range from 10 to 50 individuals (USFS ECODATA database 2000, S. Rinehart, personal observation). Habitat includes the rimrock on top of Bullion Butte and gravelly / pebbly ridge tops (North Dakota Natural Heritage database 2000) although it is also found on rocky ridges and hillsides (USFS ECODATA database 2000; S. Rinehart, personal observation). This species has also been found near the Buffalo Gap National Grassland.

Direct and Indirect Effects on NFS Lands

Livestock and recreation trampling can be a problem for some of the sensitive species within this plant group. Excessive and repeated soil compaction may result in reduced plant vigor. Populations of alyssum-leafed phlox, Torrey's cryptantha, and Hooker's townsendia grow in shallow soil on butte tops and rocky ridges and may be directly affected by trampling. In addition, rimrock plants are often stressed due to harsh growing conditions and are less resilient to disturbance.

Competition from non-native invasive plants can be a significant threat. Invasive species can often out compete native species and reduce their diversity. Recreation and livestock grazing can encourage spread of invasive species.

Noxious weeds such as leafy spurge and Canadian thistle are found in scattered populations throughout the mixed grass and shortgrass plains. Noxious weeds reduce the quality of habitat for these species but at the same time, efforts to control spurge and other invasive species with chemicals can pose a direct threat to sensitive species.

Ground-disturbing activities associated with oil, gas, mineral, and other types of development could result in mortality for these species or place their populations at risk.

Roads can negatively affect plant populations of these species by introducing non-native plant species along travel routes, by habitat fragmentation, and by loss of suitable habitat to disturbance.

Recreation can have effects depending on type of recreational use, road and trail use patterns and intensities, rate of spread of invasive, non-native plant species along recreational routes, and other factors. Even limited recreation use on fragile rimrock habitat may be detrimental to species found on these sites.

Grasshopper spraying has the potential to impact insect pollinator populations. Specific pollinator information for these plant species is not well known.

Excessive removal of vegetation on uplands and buttes can result in rill, sheet, and gully erosion and excessive soil and water runoff. Increased rates of channelization can result in lowered water tables. Any activities that lower water tables below the effective rooting zone of these species places individual plants or populations at risk.

Livestock grazing and burning can have positive, neutral, or negative effects on these species depending on frequency, intensity, and timing of disturbance and on the life history characteristics of the individual plant species.

Burning may invigorate species habitat and enhance nutrient cycling in the soil. Prairie species evolved under frequent fire events. Most perennial species are not permanently injured by burn events, however some species mortality may occur, especially during hot burn events.

Grazing can reduce dead material in plants and open up canopy layers of plants, allowing for the germination and establishment of new plants. Repeated grazing may prevent some sensitive plant species from completing their life cycle and may also reduce carbohydrate reserves.

Cumulative Effects

Continued loss of suitable habitat through conversion of rangelands to croplands can be expected to occur on private lands (Ostlie et al. 1997, USDA Forest Service 2000).

It is likely that noxious weeds will remain as threats in the habitats of these species on private and public lands in and around NFS lands (Ostlie et al. 1997).

Development activities such as road and building construction on private lands will continue, resulting in some loss of suitable habitat for sensitive plant species and some possible mortality of sensitive plants and population loss.

Livestock grazing and mowing practices that are unfavorable for the conservation of sensitive plant species are likely to continue on some private lands (Ostlie et al. 1997).

Insecticide spraying on adjacent croplands may reduce or threaten insect pollinators for some sensitive plant species (Arenz and Joern 1996, Ostlie et al. 1997).

Interrelated and Interdependent Actions

Determining range to be suitable for livestock grazing most often results in issuance of a livestock grazing permit for that area or inclusion of the area into a livestock grazing agreement.

Decisions to make NFS lands available for oil and gas leasing can result in an application permit to drill (APD) and eventual on-site development and additional roads, traffic and pipelines.

Conservation Measures and Mitigation

The following conservation measures are presented as management direction under Alternative 3 in the revised LRMP:

Unit-wide Direction (Chapter 1)

LMNG

- Avoid placing new facilities and developments such as water tanks and impoundments in habitat occupied by sensitive plant species (Guideline).
- Identify sensitive plant habitats as priorities for noxious weed and invasive plant monitoring and control (Guideline).
- Avoid the use of noxious weed and invasive plant control methods that may negatively impact sensitive plants (Guideline).
- Design timing, intensity, and frequency of mowing, burning and livestock grazing to maintain or increase sensitive plant species populations and the health of rare plant communities (Standard).
- Do not authorize vegetation management and construction projects that would further isolate or prevent re-colonization of sensitive plant populations (Standard).
- Maintain hydrological regimes and protect and restore developed springs and seeps where habitat for sensitive plant species would be enhanced (Guideline).
- Ensure that management actions do not contribute to loss of population viability for Forest Service sensitive plant species (Standard).
- Protect known sensitive plant populations from land use activities that cause increased trampling or soil compaction within key habitats (Guideline).
- Enhance and improve habitat for known sensitive plant populations through restoration programs (Guideline).
- Prohibit use of pesticides that would adversely affect species at risk (Guideline).
- Prioritize nearby lands with important or unique habitat for threatened, endangered and sensitive species habitat for acquisition (Guideline).

Geographic Area Direction (Chapter 2)

GRNG, LMNG

- Complete and initiate implementation of conservation strategies for sensitive plant species within this guild (Guideline).
- Conduct target surveys or baseline assessments for high priority species within this guild (Guideline).
- Ensure that timing, intensity and frequency of livestock grazing maintains and / or increases sensitive plant species populations and rare plant communities found on buttes (Guideline).
- Enhance conservation of sensitive plant species by developing educational and interpretive materials for buttes that receive high public use (Guideline).
- Protect springs and seeps found on buttes from livestock disturbance. Avoid placing new water developments on the tops and sides of buttes containing sensitive plant species or rare plant communities (Guideline).

Management Area Direction (Chapter 3)

LMNG (MA 2.1 – Pretty Butte, Black Butte and Round Top Butte Special Interest Areas)

- Allow uses and activities that maintain and enhance the characteristics for which the SIA was designated (Standard).
- Complete site-specific plans for managing the area prior to promoting public visits to a SIA or making significant changes to its land management (Standard).
- Restore natural ecological processes when needed to maintain or enhance the habitats or features for which the SIA was designated (Guideline).
- Reclaim disturbed lands to a condition suitable for the purposes for which the SIA was identified (Standard).
- Develop and initiate implementation of management plans for Pretty Butte, Black Butte, and Round Top Butte (Guideline).
- No ground disturbing mineral activities are permitted; however, existing valid rights will be honored (Standard).
- Prohibit removal of mineral material (Standard).
- Prohibit OHV trail construction (Standard).
- Existing utility corridors may be maintained until they are abandoned. New utility corridors or additional development within existing corridors will be permitted only where associated with valid existing rights (Standard).
- Prohibit new special-use facilities except for valid existing rights (Guideline).

Monitoring Direction (Chapter 4)

LMNG

- Monitor populations and habitat.

Biological Determinations, Risk Assessments, and Rationale

LMNG (all species in this group)

Determination is "may adversely impact individuals but are not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide."

Hooker's townsendia is ranked as critically imperiled in the state because of extreme rarity (North Dakota Natural Heritage Program 1999). Alyssum-leaved phlox is ranked as S1/S2, imperiled because of rarity. Both species are known from less than five populations each on the Little Missouri National Grassland.

Butte habitat upon which these species depend is uncommon within the planning area and planning unit. Suitable habitat is also limited on adjacent private, state, other federal, or tribal lands. In addition, seed sources may not be available for colonization into these habitats.

Threats to the species primarily include environmental stresses, disturbances from trampling, and competition from non-native species. The habitats upon which these species depend can be fragile and have a low tolerance to disturbance. Environmental stresses such as drought, high winds, and temperature extremes are common on butte tops. Rimrock in particular have low vegetative cover, less developed soil horizons, and an abbreviated growing season. Some plant populations associated with this habitat exhibit high ranges of plant mortality from year to year (USFS ECODATA database 2000; USFS files, Medora Ranger District; Susan Rinehart, personal observation).

Alternative 3 would restore fire, rest, and herbivory as natural ecological processes to varying levels. These alternatives would provide for a greater mosaic of habitat conditions across the landscape. In addition, livestock grazing and trampling on fragile environments may be reduced by the decreases in livestock levels under this alternative. The acres of rangeland annually rested from livestock grazing under this alternative also more closely approximates the conditions under which the species evolved as compared to current grazing conditions (USDA Forest Service 2000). The levels of prescribed fire within Alternative 3 are a positive move towards restoring the natural fire regime. Alternative 3 also provides for no net increase (from current levels) of noxious weeds, combined with decreases in grazing levels. The spread of noxious and exotic species is one of the primary threats to the maintenance of high quality native habitat on the Grasslands (USDA Forest Service 2000).

Under Alternative 3, Square Butte, Black Butte, Roundtop Butte, and Pretty Butte are allocated to Special Interest Area (SIA) management. These proposed SIAs may provide suitable, although currently unoccupied, habitat for species within this guild.

Under Alternative 3, concerns exist for protection of sensitive species and rare plant communities within 1.2a Suitable for Wilderness Management Area direction. Under most circumstances, such management may offer a degree of protection to TES species and habitats within the area. However, the number of rare species and unique habitat found on the Bullion Butte escarpment may not be compatible with large increases in recreational use.

The fragile rimrock habitat on top of the butte may become the destination point for recreational users. As the second highest point in North Dakota, Bullion Butte escarpment offers scenic vistas from the butte's flat top. There may be increases in recreation visits to the site.

Most recreational interest is likely to be focused upon the butte top and rock escarpment. These locations are also the most fragile and contain sensitive plant populations, rare plant communities, and the unique habitats upon which they depend. Grazing, livestock trampling and introduction of non-native plant species into sensitive plant habitat would also continue under this designation, increasing the likelihood of cumulative effects.

All of the species are peripheral species, on the edge of their range, so loss of individuals or populations would not lead to loss of species viability rangewide. However, peripheral populations are of value because they are often genetically different from populations that are more widespread within the common range of the species.

The low numbers of populations of Torrey’s cryptantha are a concern under this alternative and monitoring should be conducted for the species. Target floristic surveys during the appropriate time of year should be conducted.

Outcome VI is selected as the risk assessment for Torrey's cryptantha and Hooker's townsendia. Both species are known from very limited populations in the planning unit. This will result in strong limitations on interactions among local populations, high potential for genetic isolation, and uncertainty about the species response to climatic stochastic. Population augmentation may be required.

Outcome II is selected as the risk assessment for alyssum-leaved phlox. Habitat of sufficient quality and abundance will be maintained for this species. Numerous populations are known for this species and populations often consist of numerous individuals.

BGNG

Biological determinations are not made Hooker's townsendia because it is not listed as sensitive by Region 2 of the Forest Service. The species has not been found on the national grassland but has been found on nearby private lands.

Western Wooded Draw Guild

This plant group includes the habitat types found within the wooded draws in the western part of the planning area. The wooded draws are predominately green ash / chokecherry / snowberry habitat types. Only one Table H-3 plant species, blue lips, is identified as occurring in wooded draws. This species occurs primarily in niches of low evapotranspiration rates, added moisture conditions, and limited sunlight reflectance in the mixed grass prairie. This species has already been addressed as part of the western plains riparian plant group.

Section 5. Additional Supporting Information

Seral Stage and Vegetation Structure

Seral stage (successional status) and vegetation structure are important factors that influence habitat suitability for many wildlife species and the distribution of many plant species. Livestock grazing, prescribed burning, and rest are valuable tools that can be used to help manage for a desired vegetation mosaic. The ability to manage timing, intensity, frequency and duration of livestock grazing is critical if vegetation composition and structure objectives are to be met in a timely manner.

To provide expanded levels of suitable and quality habitat for a diversity of plant and animal species across the national grasslands and forests, the revised LRMPs provide direction to focus additional management on providing early and late seral stages and low and high vegetation structure. The desired mix of seral stages and vegetation structure levels prescribed in the revised LRMPs for grasslands and sagebrush habitats are summarized below in Table H-8. The information on seral stages and vegetation structure presented in these tables is based on the acres of suitable range and the midpoints of the ranges presented in the revised LRMPs for desired vegetation conditions. The biological determinations made in this biological assessment and evaluation assume that the midpoints of these ranges will be achieved over the next 10 to 15 years.

Table H-8. Seral Stages (acres and percent of area) – Dakota Prairie Grasslands

Planning Unit	Early	Mid	Late
LMNG	110,500 (12.5%)	619,100 (70%)	154,800 (17.5%)
Rolling Prairie	53,200 (12.5%)	298,100 (70%)	74,500 (17.5%)
Badlands	57,300 (12.5%)	321,000 (70%)	80,300 (17.5%)
GR/CRNG	19,900 (12.5%)	111,300 (70%)	27,800 (17.5%)
SNG	5,200 (7.5%)	40,000 (57.5%)	24,300 (35%)

Table H-9. Seral Stages (acres and percent of area) – All Other Planning Units

Planning Unit	Early	Early-Intermediate	Late-Intermediate	Late
FPNG	11,300 (10%)	22,500 (20%)	45,000 (40%)	33,800 (30%)
BGNG	52,000 (10%)	94,400 (17%)	252,000 (46%)	146,400 (27%)
Fall River Northeast	8,700 (10%)	8,700 (10%)	43,400 (50%)	26,000 (30%)
Fall River Southeast	5,000 (5%)	20,100 (20%)	50,200 (50%)	25,100 (25%)
Fall River West	6,000 (5%)	17,900 (15%)	71,500 (60%)	23,800 (20%)
Wall Northeast	6,900 (10%)	13,800 (20%)	27,500 (40%)	20,600 (30%)
Wall Southeast	8,400 (10%)	16,900 (20%)	33,800 (40%)	25,300 (30%)
Wall Southwest	17,000 (20%)	17,000 (20%)	25,600 (30%)	25,600 (30%)
ONG	4,000 (5%)	11,900 (15%)	47,600 (60%)	15,900 (20%)
NNF-Pine Ridge	3,100 (10%)	3,100 (10%)	18,900 (60%)	6,300 (20%)
NNF- Bessey	8,900 (10%)	8,900 (10%)	35,600 (40%)	35,600 (40%)
SRMNF	11,200 (10%)	11,200 (10%)	45,000 (40%)	45,000 (40%)
TBNG	97,900 (18%)	170,900 (32%)	174,200 (33%)	89,100 (17%)
Broken Hills	23,300 (15%)	46,700 (30%)	54,500 (35%)	31,100 (20%)
Cellars Rosecrans	36,200 (30%)	36,200 (30%)	30,200 (25%)	18,100 (15%)
Fairview Clareton	13,600 (15%)	31,700 (35%)	31,700 (35%)	13,600 (15%)
Hilight/Bill	12,900 (15%)	30,100 (35%)	30,100 (35%)	12,900 (15%)
Spring Creek	7,300 (15%)	17,000 (35%)	17,000 (35%)	7,300 (15%)
Upton/Osage	4,600 (15%)	9,200 (30%)	10,700 (35%)	6,100 (20%)

Table H-10. Vegetation Structure (acres and percent of area) – All Planning Units

Planning Unit	Low	Moderate	High
LMNG	132,700 (15%)	530,700 (60%)	221,000 (25%)
Rolling Prairie	63,900 (15%)	255,500 (60%)	106,400 (25%)
Badlands Prairie	68,800 (15%)	275,200 (60%)	114,600 (25%)
GR/CRNG	23,900 (15%)	95,400 (60%)	39,700 (25%)
SNG	5,200 (7%)	40,000 (58%)	24,300 (35%)
FPNG	22,500 (20%)	45,000 (40%)	45,100 (40%)
BGNG	118,500 (22%)	265,000 (49%)	161,500 (30%)
Fall River Northeast	9,100 (10%)	47,800 (55%)	29,900 (35%)
Fall River Southeast	25,100 (25%)	50,200 (50%)	25,100 (25%)
Fall River West	23,800 (20%)	71,500 (60%)	23,900 (20%)
Wall Northeast	13,800 (20%)	27,500 (40%)	27,500 (40%)
Wall Southeast	21,100 (25%)	33,800 (40%)	29,500 (35%)
Wall Southwest	25,600 (30%)	34,200 (40%)	25,600 (30%)
ONG	15,900 (20%)	47,600 (60%)	15,900 (20%)
NNF-Pine Ridge	3,100 (10%)	23,600 (75%)	4,700 (15%)
NNF- Bessey	2,200 (2%)	44,500 (50%)	42,300 (48%)
SRMNF	2,800 (2%)	56,200 (50%)	53,400 (48%)
TBNG	123,000 (23%)	229,200 (43%)	179,700 (34%)
Broken Hills	31,100 (20%)	70,000 (45%)	54,500 (35%)
Cellars Rosecrans	42,300 (35%)	36,200 (30%)	42,200 (35%)
Fairview Clareton	18,100 (20%)	45,300 (50%)	27,200 (30%)
Hilight/Bill	17,200 (20%)	43,000 (50%)	25,700 (30%)
Spring Creek	9,700 (20%)	19,400 (40%)	19,400 (40%)
Upton/Osage	4,600 (15%)	15,300 (50%)	10,700 (35%)

Ungrazed Habitats

The amount of habitat not grazed by livestock each year is also prescribed as broad-scale management direction in the revised LRMPs. These habitats commonly provide high vegetation structure and reduced levels of disturbance and are favored by some species at risk. The amount of ungrazed habitats prescribed for each national grassland and forest is presented below in Table H-11. This information is based on the midpoints of the ranges prescribed in the revised LRMPs, and the biological determinations made in this biological assessment and evaluation assume that the midpoints of these ranges will be achieved over the next 10 to 15 years.

Table H-11. Ungrazed Habitats (acres and percent of area) – All Planning Units

Planning Unit	Ungrazed Habitat	
	acres	percent
LMNG	51,300	5%
Rolling Prairie	22,600	5%
Badlands	28,700	5%
GR/CRNG	7,900	5%
SNG	3,500	5%
FPNG	11,200	10%
BGNG	27,200	5%
Fall River Northeast	4,300	5%
Fall River Southeast	5,000	5%
Fall River West	6,000	5%
Wall Northeast	3,400	5%
Wall Southeast	4,200	5%
Wall Southwest	4,300	5%
ONG	4,000	5%
NNF-Pine Ridge	1,600	5%
NNF- Bessey	4,900	5%
SRMNF	6,200	5%
TBNG	27,300	5%
Broken Hills	8,600	5%
Cellars Rosecrans	6,000	5%
Fairview Clareton	4,500	5%
Hilight/Bill	4,300	5%
Spring Creek	2,400	5%
Upton/Osage	1,500	5%

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Travis Livieri, Wall, South Dakota (Black-footed Ferret)

Mike Lockhart, U.S. Fish and Wildlife Service, Laramie, Wyoming (Black-footed Ferret)

Bob Luce, Wyoming Game and Fish Department, Rock Springs, Wyoming (Black-tailed Prairie Dog and Black-footed Ferret)

Ron Martin, Regional Editor, *North American Birds*, Sawyer, North Dakota (Mountain Plover, Pygmy Nuthatch, Black-backed Woodpecker)

Dr. Judy Maxwell, Bismarck, North Dakota (Butterflys)

Len McDaniel, U.S. Fish and Wildlife Service, Valentine, Nebraska (Greater Prairie Chicken)

Dr. Robert Murphy, U.S. Fish and Wildlife Service, Kenmore, North Dakota (Burrowing Owl and Ferruginous Hawk)

Olin Oedekoven, Wyoming Game and Fish Department, Gillette, Wyoming (Sage Grouse)

Bill Perry, U.S. Forest Service, Wall, South Dakota (Black-tailed Prairie Dog and Black-footed Ferret)

Dr. Glenn Plumb, National Park Service, Mammoth Springs, Wyoming (Black-tailed Prairie Dog and Black-footed Ferret)

Robert Rosenfield, University of Wisconsin, Stevens Point, Wisconsin (Merlin)

Dr. Ronald A. Royer, Minot State University, Minot, North Dakota (Butterflys)

Alan Sands, Bureau of Land Management, Boise, Idaho (Sage Grouse)

Doug Sargent, U.S. Forest Service, Wall, South Dakota (Black-tailed Prairie Dog and Black-footed Ferret)

Michael A. Schroeder, Washington Department of Fish and Wildlife, Bridgeport, Washington (Sage Grouse)

Dave Seery, U.S. Fish and Wildlife Service, Denver, Colorado (Black-tailed Prairie Dog)

Dr. Carolyn Sieg, U.S. Forest Service, Flagstaff, Arizona (Western Prairie Fringed Orchid)

Wayne Stancill, U.S. Fish and Wildlife Service, Pierre, South Dakota (Rare Native Fishes)

Dr. Daniel Uresk, U.S. Forest Service, Rapid City, South Dakota (Black-tailed Prairie Dog and Swift Fox)

William Vodehnal, Nebraska Game and Parks Commission, Bassett, Nebraska (Greater Prairie Chicken)