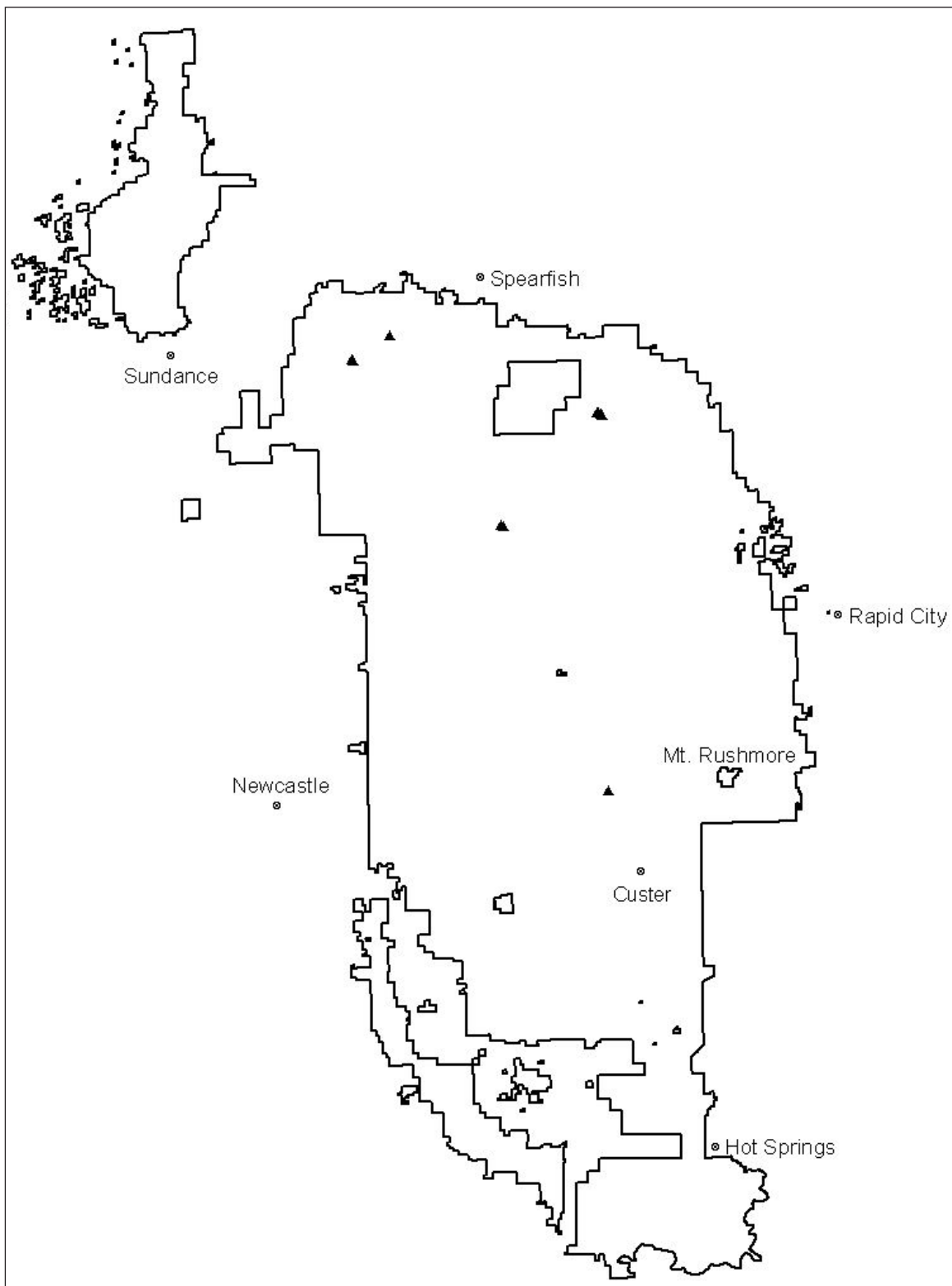


Figure 3-10. General Distribution Of *Lycopodium Annotinum* On Lands Administered By The Black Hills National Forest



3-3.2.3.7. Alpine Mountainsorrel (*Oxyria digyna*)

Affected Environment

Oxyria digyna is widely distributed in arctic and alpine regions of North America and across the western United States. It occurs from Greenland to Alaska and south into the mountains of New Hampshire and New Mexico (NatureServe 2005). First documented in the Black Hills in 1983 (Allen et al. 2005), this species is currently known from four occurrences in the Harney Peak area: three on lands administered by the Black Hills National Forest in the Black Elk Wilderness and one on lands administered by the state of South Dakota in Custer State Park. Of the three occurrences in the Black Elk Wilderness, the largest occurrence was documented in the estimated range class of 500-1,000 individuals. The other two occurrences in the Wilderness each have less than 50 individuals.

Elsewhere in its range, associated habitat characteristics generally include damp rocky places in mountains, especially by streams (Clapham et al. 1962), rocky areas in mountains (Dorn 2001), or moist ground in alpine or subalpine areas (Hitchcock and Cronquist 1973). In addition, the species is described as being adapted to coarse textured soils, rather than fine textured soils. Within the Black Hills, the plant is located in similar conditions. The Forest occurrences are located at the highest elevations in the Black Hills, at 6,800 to 7,200 feet in the Black Elk Wilderness and are located within areas of coarse-textured soils in steep, granite outcrop areas and narrow gullies and have partial to full shade conditions (USDA Forest Service 2005a).

Oxyria digyna occurrences are located within a limited geographic range on the Black Hills. The occurrences are located at some of the highest locations within two watersheds on the Forest, and all Forest occurrences are located within approximately the same section (1 square mile). All three occurrences are located in one management area: MA 1.1A – Black Elk Wilderness.

Since the species is currently known from few occurrences within a limited area of the granitic core region in South Dakota, *Oxyria digyna* is assigned a rank of critically imperiled (S1) in South Dakota. The species is much more common in Wyoming (likely due to much greater expanses of high elevation areas as compared to what is available in South Dakota) and is ranked as apparently secure (S4) (NatureServe 2005). The global rank for *O. digyna* is assigned as demonstrably secure (G5) (NatureServe 2005).

Direct And Indirect Effects

On the Forest, *Oxyria digyna* is relatively secure from most potential risks associated with a variety of activities (roads, harvest activities, livestock use). Potential risks to this species in the Wilderness and nearby Custer State Park may include vulnerability to disturbance by hikers and climbers, potential trail maintenance activities and trampling and browsing from non-native mountain goats (*Oreamnos americanus*) (Allen et al. 2005) or browsing by elk (*Cervus elaphus*). Due to the limited number of occurrences, disturbances at or near these sites could pose significant risks to individual occurrence persistence. In addition, invasion by noxious weeds or other exotic plant species and efforts to control them and future fire-suppression efforts could be potential risks.

All occurrences on Forest administered land are located within the highest elevations of the Black Elk Wilderness (MA 1.1). The plants are located in areas that are currently not grazed by livestock and the plants are located in the upper headwaters of rock outcrop areas and bouldery steep gradient watersheds that are fairly resistant to alteration by various disturbance activities. In addition, timber harvest is not deemed a persistence risk to *Oxyria digyna* because timber harvest is precluded in this management area.

Noxious weeds and other invasive exotic plant species, as well as management for their control, could present a future risk to the species. No noxious weeds have been included in the documentation for the Forest *Oxyria digyna* occurrences, however, there is potential for weeds to colonize disturbed areas (section 3-7.3 for noxious weeds) that may be located near or at the occurrence locations (potentially associated with hiking trails, climbing area traffic, or fire events). Recognizing noxious weeds and other invasive plants, and their treatment, could be expected to be a primary risk to the long-term persistence of *O. digyna* on the Black Hills, conservation strategies and measures to address and reduce direct and indirect effects are given priority discussion in this section. All alternatives propose various levels of protection for SOLC from noxious weed invasion and treatment. Objectives 231 is included in all alternatives for the prevention and reduction of noxious weed invasion into native plant communities. In Alternatives 1 and 2, the objective is to treat 3,600 acres per year. Targeted treatment acres are increased to 6,000 acres per year in Alternatives 3 and 4, and further increased to a minimum of 8,000 acres in Alternative 6. Guideline 4303 revised the priority order for treatment of weeds, and first priority of treatment is to occur at Region 2 sensitive and SOLC plant and snail occurrences. Guideline 4304 (Alternatives 1 and 2) was revised and strengthened to a standard in Alternatives 3, 4, and 6, to require treatment methods that pose the least risk to the species being protected. Alternatives 1 and 2 do not include monitoring of weed control effectiveness at SOLC plant locations to determine if weeds at those sites need to be retreated throughout the season to reduce noxious weed competition. Standard 4300-1 specifies this type of monitoring and was included in Alternatives 3, 4, and 6 to further address the risk that noxious weeds present to SOLC species such as *O. digyna*. Alternatives 1 and 2 require the use of certified noxious weed-free seed, feed and mulch on the Forest (Standard 4306). This standard was revised to require that the seed be tested at time of delivery to confirm that the seed is weed-free. The prevention of noxious weed invasion is further targeted in native plant communities by revegetating with native species as Guideline 1110 in Alternatives 1 and 2. The original guideline was revised and was strengthened to Standard 1110 in Alternatives 3, 4, and 6. Alternatives 3, 4, and 6 are expected to have the lowest risk of indirect and direct negative effects to *O. digyna* from noxious weeds and their treatment.

When there is recreation in an area, there is the potential for plant collecting to become a risk to the species. Standard 3119 is included in Alternatives 3 and 6 to restrict the collection of SOLC plants (or parts thereof) to only those needed for scientific or educational purposes, or as recognized for American Indian traditions (Standard 7103). This would prohibit collecting for both personal (other than for American Indian traditional uses) and commercial uses, thereby limiting the associated direct effects of plants removed from occurrences. It is unknown how many plants would be used for American Indian traditional uses; however, they have indicated at meetings that their interests are in maintaining plant species that have traditional uses. Although uncertain, the assumption is that traditional uses and scientific collections may be expected to directly affect individual plants, it is not expected that this type of collection would present much risk to the overall long-term persistence of this species on the Black Hills National Forest.

While reporting occurrences of rare plants has been an ongoing for many years, recent emphasis (primarily since 2000) has been placed on targeting and reporting *Oxyria digyna* occurrences during plant surveys completed on the Forest. Monitoring to be completed for Forest SOLC (USDA Forest Service 2005c) has been included in Chapter 4 of the LRMP (see Monitoring Item Species of Local Concern). The type and level of information being collected for monitoring this species is available in the Black Hills

Monitoring Implementation Guide (USDA Forest Service 2005f). In general, as identified in the design for this species, the focus for the monitoring seasons immediately following the Phase II Amendment ROD is to attempt to relocate the previously reported locations. If reported areas are relocated, the current design includes the gathering of quantitative and qualitative baseline data and assessing risks at occurrences that are relocated.

Current Forest-wide and Wilderness MA 1.1A objectives, standards, and guidelines are similar among alternatives and include Objective 418 (all alternatives) that would enhance the trail system to disperse use away from the Wilderness. Implementation of Standard 1.1A-1202 (Alternatives 3 and 6) targets protection of emphasis species by requiring that construction or reconstruction of trails be routed away from known occurrences and by not increasing climbing activity at or within the vicinity of occurrences over what currently exists (at the time of the Phase II Amendment decision). This standard is not included in Alternatives 1, 2, or 4.

Fire may be a risk to the species since there are dense conifer stands nearby, but occurrences are located in habitats that are sheltered by large rock formations that may exclude fire. Because of the risk associated with high intensity fire events, Objective 200-05 was included in Alternatives 3 and 6 to target conservation of occurrences that could be at risk by the creation or maintenance of conditions in the adjacent upland conifer stands that would be expected to increase the likelihood of dropping crown fires to the ground before reaching SOLC plant species. However, no high intensity fire-reduction treatments would be expected to occur in areas near the occurrences since they are located in the Wilderness. Alternatives 3 and 6 provide more fire-related protection to SOLC with Guideline 4102 and Standard 3200-03. Guideline 4102 in Alternatives 1 and 2 provide for protection of heritage resources, streams, stream banks, shorelines, lakes, and associated vegetation from degradation by wildfire-suppression efforts. In Alternatives 3 and 6, the protection is extended to SOLC, such as *Oxyria digyna*. In addition, Standard 3200-03 states that wildfire-suppression camps will not be placed at known mapped SOLC locations (*O. digyna* occurrences are known and mapped). Alternatives 1 and 2 do not contain this standard. However, the occurrences are located within bouldery, rocky areas that are not expected to be selected for fire camps.

Objective 200-4 was designed into Alternatives 3, 4, and 6 for conservation of species expected to be at risk from high intensity disturbance events, whether natural or human induced. This objective provides for the collection of emphasis plant species material from the Black Hills for reintroduction efforts if needed. If successful it is expected that this conservation measure would provide material to target the future long-term persistence of the species on the Black Hills under these alternatives. No direction for collection of such material as a conservation measure is included in the No Action Alternatives (Alternatives 1 and 2) so any recolonization of a site would rely on what is available for natural recolonization.

In Alternatives 3 and 6, Guideline 3206 is changed to include consideration of plants for reintroduction and to consider the risk to SOLC plant species that may occur from transplanting animals. The risks associated with the effects of the reintroduction of mountain goats and elk around the granite core of the Black Hills may present a risk to the long-term persistence of *Oxyria digyna*. This same guideline in Alternatives 1, 2, and 4 does not include plants nor give consideration to the risks to SOLC that may occur due to the transplanting of wildlife species.

None of the *Oxyria digyna* occurrences are located within any of the candidate RNAs, therefore no beneficial or negative effects are expected to be associated with any that may be proposed for designation in the Phase II Amendment decision.

Cumulative Effects

The indirect and cumulative effects analysis for species persistence is bounded in time as the next 50 years. This temporal scale is based on: a) the planning horizon (usually 50 years for a Forest plan); b) the biology of the species (e.g., generation time, response time to changed conditions, recolonization capability); and c) the time needed for the overall ecosystem to respond to proposed management (Liggett et al. 2003).

The spatial scale for cumulative effects analysis of Phase II Amendment alternatives for this plant species is smaller than generally encompasses the Black Hills Ecoregion as defined by Bailey (1995). The spatial area used for the cumulative effects analysis for *Oxyria digyna* primarily includes the Black Elk Wilderness, Mount Rushmore National Memorial and Custer State Park. This area was chosen because it encompasses similar ecosystem components to where the known occurrences are located. A larger area would include lower elevation and warmer and drier ecosystem components which includes a different suite of species.

The distribution of *Oxyria digyna* on the Forest is currently known to be limited to the highest elevations of the granite area of the Black Hills (some of the most cool and moist short season conditions found within the Black Hills). Based the limited number of occurrences within a narrow geographic range, the species' future is considered to be precarious. It is expected that here are similar associated habitat conditions within adjacent Mount Rushmore National Memorial and the northern unit Custer State Park. Both of these areas receive intense levels of recreation activities because they are recognized and highly advertised as popular destination locations. This use is expected to continue and likely increase. Information on location, abundance, and distribution for these other areas are unavailable for *O. digyna*, other than for the one location in Custer State Park. The known occurrence within Custer State Park is located in an area of what was considered to be moderate climbing activity in 2000 (Allen et al. 2005). The current status of this occurrence and the degree to which traffic to climbing areas has affected the occurrence are unknown.

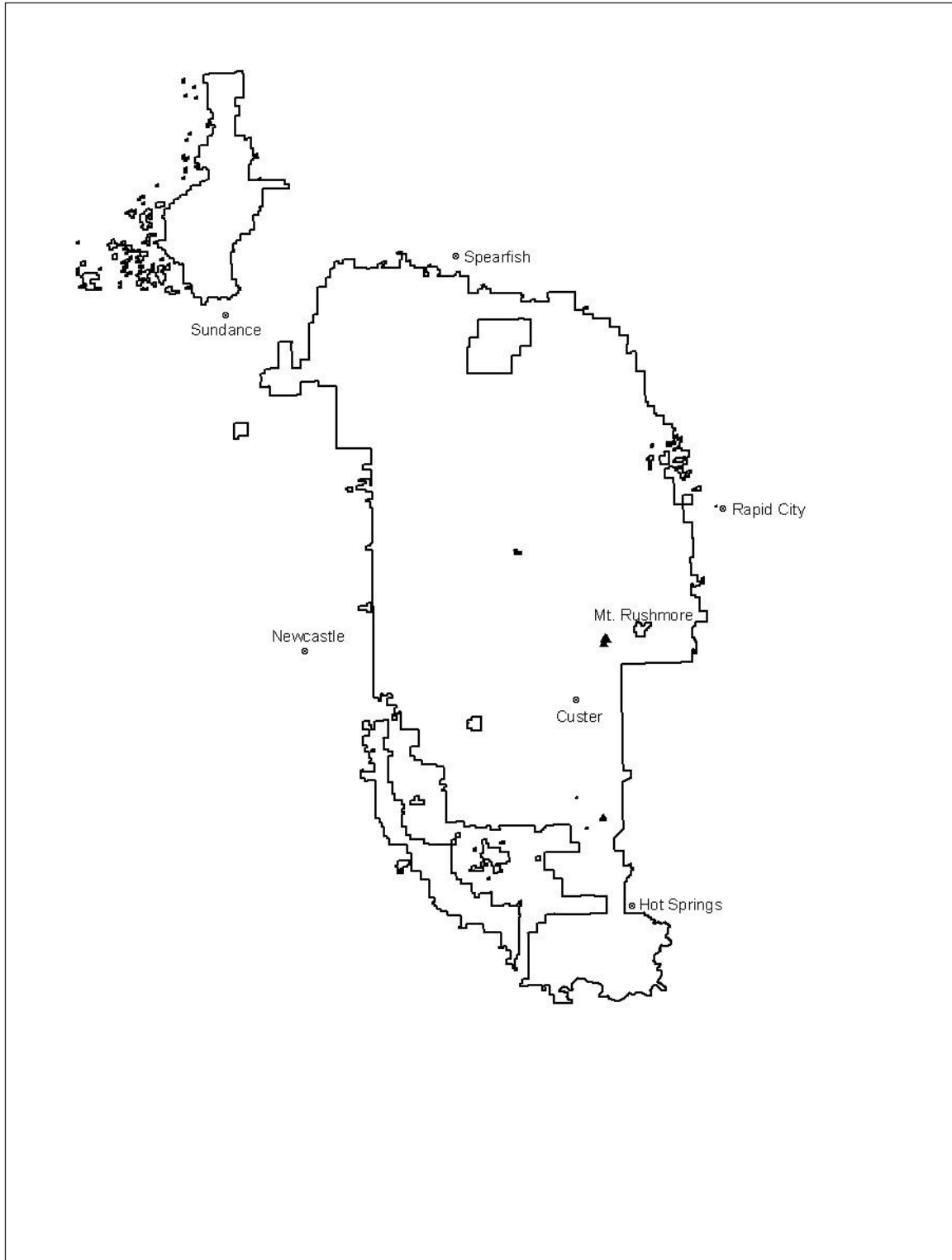
In addition, the known occurrence and other potential occurrences within Custer State Park and Mount Rushmore National Memorial likely face similar potential risks from invasive weeds and other non-native invasive species, fire, and are equally vulnerable to drought and climatic warming events. Timber is harvested in Custer State Park, but it is not considered likely that cutting or associated activities would occur in close proximity to *Oxyria digyna* habitat based on site characteristics (steep rock outcrops and boulders) that limit activities.

No *Oxyria digyna* occurrences have been reported from private land (Allen et al. 2005). Privately owned lands within the Forest boundary are not expected to have suitable associated habitat conditions (high elevation, granite rock outcrop, moist, headwater areas) for this species. As compared to where *O. digyna* is documented from, private land in the general vicinity is located at lower elevations and within watersheds with warmer climatic conditions; therefore, no cumulative effects are expected from private land activities.

It should be recognized that no matter what management actions take place, persistence of this species is uncertain based on the small number and limited size of occurrences that lends a greater vulnerability to loss from stochastic events (e.g., drought, fire). When all five alternatives and information specific to the species is considered, the most conservation opportunities and protection for *Oxyria digyna* is considered to be afforded under Alternatives 3 and 6, as described above. Therefore it is expected that the least risk to the long-term persistence of this species would be through the full implementation of those alternatives. Alternative 4 also targets conservation and protection, but the alternative takes a more passive approach (primarily focuses on more natural processes) for species rather than taking more aggressive actions if

needed, therefore it is assumed that more risk to the species persistence could be expected to be associated with this alternative. However, actions that can be taken for this species may be limited in scope since occurrences are located within the Black Elk Wilderness. The No Action Alternatives (Alternatives 1 and 2) do not include additional measures for SOLC and it is expected that the reduction of risks to the species long-term persistence would be the lowest in these alternatives, however, monitoring of the species would still be targeted.

Figure 3-11. General Distribution Of *Oxyria Digyna* On Lands Administered By The Black Hills National Forest



3-3.2.3.8. Narrowleaf Sweet Coltsfoot (*Petasites sagittatus*)

Affected Environment

Petasites sagittatus occurs in Alaska, across Canada and the northern United States from Washington to Michigan and south to Colorado and Utah. In the Black Hills, this species is disjunct from other occurrences in northeast North Dakota and the Laramie Range in southeast Wyoming. Occurrences of this species in the Black Hills and Rocky Mountains may be relics from the last Pleistocene glaciation 11,000 years ago.

Per Rydberg first documented *Petasites sagittatus* from the Black Hills in 1892 (Glisson 2003b). There are 14 fairly recent reports (1994-2004) currently listed in the Black Hills National Forest database for this species on lands administered by the Forest (USDA Forest Service 2005a). Some of these reports are from adjacent sites, and some reported locations could be combined into single larger sites in the future. The reported locations are from six watersheds (sixth order), and documented in Pennington and Lawrence Counties, South Dakota in the central Black Hills (Glisson 2003b, USDA Forest Service 2005a). All reports are from the Northern Hills and Mystic Ranger Districts. Two additional reports in the Black Hills are documented from private land (Glisson 2003b). Forest reported locations are documented within the following designated Management Areas (MA):

MA 3.1 – Botanical Areas – Approximately 21 percent of the reports are from the Black Fox Botanical Area.

MA 3.7 – Late-successional Forest Landscapes – Approximately 7 percent of the reports are located within a portion of this management area.

MA 5.1 – Resource Production Emphasis – Approximately 71 percent of the reports are located within this management area.

Elsewhere within the species range, *Petasites sagittatus* is reported to be associated with cold and wet marshy conditions and is a facultative wetland plant that has withstood periodic drought conditions (Glisson 2003b). Glisson (2003b) indicated that there is little information available on the habitat needs for this species in the Black Hills. However, a variety of associated conditions have been recorded at the reported locations. Information includes conditions that are characterized by open to partial shade tree canopies and sites range in elevation from 5,400 to 6,750 feet (USDA Forest Service 2005a). Site reports most often document individuals associated with dry to mesic to wet meadows and gentle slope areas along streams with saturated soils. *Picea glauca* (white spruce) is the tree species documented at six sites (again with very low canopy conditions); however, *Populus tremuloides* (aspen) and *Ponderosa pine* (ponderosa pine) are also documented at various locations. A variety of *Salix* (willow) species are documented at the majority of the reported locations.

Petasites sagittatus is a rhizomatous forb of boreal forests that typically flowers before the leaves expand in the spring (Glisson 2003b). Seed or pollen transport may occur via water, wind, migratory birds, or insects. Because the Black Hills occurrences are over 100 miles from occurrences elsewhere within its range, natural pollen and seed transfer between occurrences is likely limited (Glisson 2003b).

The currently assigned global conservation rank for this northern species is demonstrably secure (G5). The southern occurrences of northern or boreal species are often more disjunct and smaller in size than northern occurrences, limited by the availability of cooler and moister conditions. This is likely the case with *Petasites sagittatus* occurrences in South Dakota. *P. sagittatus* is currently assigned a South Dakota

conservation rank of critically imperiled (S1) because of rarity (NatureServe 2005); however, since that rank was assigned, recent newly discovered site reports (2004) has increased the total number above those identified in the S1 definition, and it may be expected that the state rank will likely be revised to a higher rank in the future to reflect this new information.

Direct And Indirect Effects

Since this is a facultative wetland species, the primary risk to its persistence and reproductive success is likely any lowering of the water table or altered hydrology where it occurs, whether it is natural or human-induced. Noxious weeds other non-native plant species, effects associated with intensive livestock use, recreational impacts (potentially associated with the adjacent Black Fox Campground, Off Road Vehicle use and the nearby Mickelson Trail) and climatic change (drought stress) are associated with risks to this species long-term persistence on the Black Hills (Allen et al. 2005, Glisson 2003b). *Lythrum salicaria* (purple loosestrife) is not reported to occur at any of the larger sites, or anywhere close by, but is very aggressive and has the potential to outcompete riparian natives, including *Petasites sagittatus*. Information on noxious weeds is limited for reported locations. Intensive levels of livestock use is included in the documentation that is currently available from two of the locations (USDA Forest Service 2005a) and it is expected that the shallow rhizomes of this species is vulnerable to effects from trampling (Allen et al. 2005).

Some of the associated habitat condition areas (near riparian areas and wetlands) in which *Petasites sagittatus* occurrences have been located on the Forest are generally targeted for conservation. Consequently, implementation of the Phase II Amendment alternatives may be expected to generally benefit the species though the level of targeted conservation actions varies among alternatives.

Objective 214 targets the restoration of 500 acres of riparian shrublands under Alternatives 1, 2, 4, and 6. Alternative 3 targets the restoration of 1,000 acres of riparian shrublands.

If riparian shrubland activities occur in areas near *Petasites sagittatus* occurrences, successful restoration could be expected to help conserve adjacent mesic soil conditions that could be expected to benefit this species. In terms of specific restoration treatments for aspen (Objective 201), a species that often occurs near riparian and open canopy meadow areas is expected to contribute to the conservation of adjacent mesic conditions for *P. sagittatus*, Alternatives 3 and 6 exceed the other alternatives. Objective 201 targets a minimum of 46,000 acres of aspen restoration for Alternative 3, and Alternative 6 would manage for 92,000 acres of aspen (the same increase as Alternative 3). In comparison, the Alternatives 1 and 2 call for a 10-percent increase of hardwoods (not limited to aspen), and Alternative 4 calls for a 20-percent increase as compared to 1995 conditions. Objective 205 under Alternatives 1, 2, and 4 directs the restoration of 10 percent of meadows and prairie across the Forest over 1995 conditions. Under Alternative 3, this objective targets the restoration of 2,400 acres of meadow (approximately triple the current meadow acreage) during the life of the LRMP. Alternative 6 basically targets the same restoration figure for meadows, but is worded to reflect managing 3,600 acres of meadow during the life of the Plan. Both of these alternatives target the restoration of meadows that have been encroached on by conifers and managing for meadows with these open conditions are expected to reduce risks associated with conifer encroachment to *P. sagittatus*.

All alternatives contain a substantial number of measures to avoid and minimize direct and indirect impacts to riparian and wetland systems from livestock use; however, Alternatives 3 and 6 contain additional conservation measures for these systems. Guidelines 2505 and 2507 (Alternatives 1, 2, and 4) target the management of grazing in riparian areas to a residual objective; under Alternatives 3 and 6 these guidelines are strengthened to standards to target the objective of conserving or enhancing riparian habitats. Approximately 21 percent of the *Petasites sagittatus* reports are from within the Black

Fox Botanical Area (USDA Forest Service 2005a). Standard 3.1-2501 allows livestock grazing within Botanical Areas only if it does not conflict with values for which the area was designated. Standard 2503 is included in Alternatives 3, 4, and 6 to further protect SOLC plant species from direct effects of livestock use by restricting access of livestock at SOLC plant locations. Therefore, it is expected that indirect and direct effects to *P. sagittatus* from livestock use would be the least under Alternatives 3 and 6.

Noxious weeds and other invasive exotic plant species, as well as management for their control, could present a future risk to the species. Noxious weeds are documented along riparian and meadow areas throughout the Black Hills and there is potential for weeds to colonize disturbed areas (see Section 3-7.3 for noxious weeds) that may be located near or at the *Petasites sagittatus* occurrence locations. Recognizing noxious weeds and other invasive plants, and their treatment, could be expected to be a primary risk to the long-term persistence of *P. sagittatus* on the Black Hills, conservation strategies and measures to address and reduce direct and indirect effects are given priority discussion in this section. All alternatives propose various levels of protection for SOLC from noxious weed invasion and treatment. Objective 231 is included in all alternatives for the prevention and reduction of noxious weed invasion into native plant communities. In Alternatives 1 and 2, the objective is to treat 3,600 acres per year. Targeted treatment acres are increased to 6,000 acres per year in Alternatives 3 and 4, and further increased to a minimum of 8,000 acres in Alternative 6. Guideline 4303 revised the priority order for treatment of weeds, and first priority of treatment is to occur at Region 2 sensitive and SOLC plant and snail occurrences. Guideline 4304 (Alternatives 1 and 2) was revised and elevated to a standard in Alternatives 3, 4, and 6, to require treatment methods that pose the least risk to the species being protected. Alternatives 1 and 2 do not include monitoring of weed control effectiveness at SOLC plant locations to determine if weeds at those sites need to be retreated throughout the season to reduce noxious weed competition. Standard 4300-1 specifies this type of monitoring and was included in Alternatives 3, 4, and 6 to further address the risk that noxious-weeds present to sensitive plant species such as *P. sagittatus*. Alternatives 1 and 2 require the use of certified noxious weed-free seed, feed and mulch on the Forest (Standard 4306). This standard was revised to require that the seed be tested at time of delivery to confirm that the seed is weed-free. The prevention of noxious weed invasion is further targeted in native plant communities by revegetating with native species as Guideline 1110 in Alternatives 1 and 2. The original guideline was revised and was strengthened to Standard 1110 in Alternatives 3, 4, and 6. Alternatives 3, 4, and 6 are expected to have the lowest risk of indirect and direct negative effects to *P. sagittatus* from noxious weeds and their treatment.

When there is recreation in an area (such as associated with Black Fox Campground), there is the potential for plant collecting to become a risk to plant species. Standard 3119 is included in Alternatives 3 and 6 to restrict the collection of SOLC plants (or parts thereof) to only those needed for scientific or educational purposes, or as recognized for American Indian traditions (Standard 7103). This would prohibit collecting for both personal (other than for American Indian traditional uses) and commercial uses, thereby limiting the associated direct effects of plants removed from occurrences. It is unknown how many plants would be used for American Indian traditional uses; however, they have indicated at meetings that their interests are in maintaining plant species that have traditional uses. Although uncertain, the assumption is that traditional uses and scientific collections may be expected to directly affect individual plants, however it is not expected that this type of collection would present much risk to the overall long-term persistence of this species on the Black Hills National Forest.

While reporting occurrences of rare plants has been an ongoing for many years, recent emphasis (primarily since 2000) has been placed on targeting and reporting *Petasites sagittatus* occurrences during plant surveys completed on the Forest. Monitoring to be completed for Forest SOLC (USDA Forest Service 2005c) has been included in Chapter 4 of the LRMP (see Monitoring Item Species of Local Concern). The type and level of information being collected for monitoring this species is available

in the Black Hills Monitoring Implementation Guide (USDA Forest Service 2005f). In general, as identified in the design for this species, the focus for the monitoring seasons immediately following the Phase II Amendment ROD is to attempt to relocate the previously reported locations. If reported areas are relocated, the current design includes the gathering of quantitative and qualitative baseline data and assessing risks at occurrences that are relocated.

Because conifer encroachment has been recognized as a risk to the some of the species reported locations a widespread reduction in the amount of conifer cover in watersheds where it occurs that may be caused by a wildfire, large scale mountain pine beetle (MPB) infestations, or through intensive acreages of fuel reduction thinning, or insect-management activities to the extent that an increase in the water table that could actually be realized at the known *Petasites sagittatus* occurrences could be expected to contribute to the conservation or increasing the extent of saturated soil conditions and would be expected to benefit this species. Various areas of higher mountain pine beetle hazard ratings would be expected to be reduced under all alternatives as vegetation treatments occur. Alternative 6 emphasizes more treatment acres reducing fire hazard and risk (see Section 3-7.2). Four of the *P. sagittatus* reported locations are located within the 1.5-mile WUI potential treatment zone of the designated Rochford ARC.

Forest-wide Guideline 8101 (all alternatives) prioritizes lands with riparian areas and streams for land acquisition. Acquisition of the any of the land upstream of the *Petasites sagittatus* occurrences could be expected to reduce the potential of development and associated potential effects of hydrologic alterations to downstream occurrences. Acquisition is dependent upon funding, land availability, and landowner willingness to participate. If land above the *P. sagittatus* occurrences could be acquired, the assumption is that this action would be expected to reduce the potential for long-term risk to the species and could contribute to conservation of the species.

None of the *Petasites sagittatus* occurrences are located within any of the candidate RNAs, therefore no beneficial or negative effects are expected to be associated with any that may be proposed for designation in the Phase II Amendment decision.

Cumulative Effects

The indirect and cumulative effects analysis for species persistence is bounded in time as the next 50 years. This temporal scale is based on: a) the planning horizon (usually 50 years for a Forest plan); b) the biology of the species (e.g., generation time, response time to changed conditions, recolonization capability); and c) the time needed for the overall ecosystem to respond to proposed management (Liggett et al. 2003).

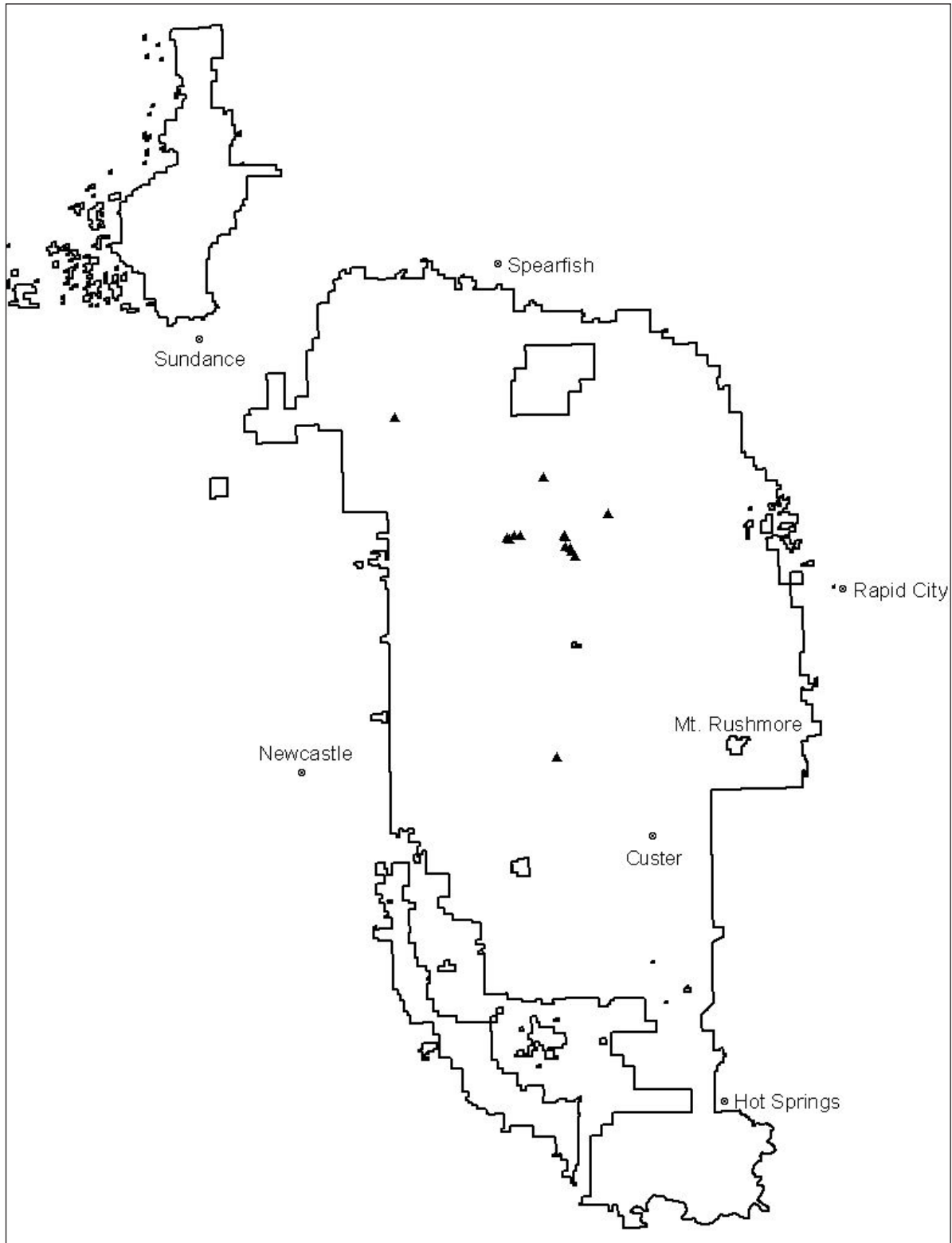
The spatial scale for cumulative effects analysis of Phase II Amendment alternatives for this plant species is smaller then generally encompasses the Black Hills Ecoregion as defined by Bailey (1995). The spatial area used for the cumulative effects analysis for *Petasites sagittatus* primarily includes areas from approximately 5,400 feet and above in elevation in the central portion of the Black Hills in the Redwater River, Lower Belle Fourche River, Middle Cheyenne River and Rapid Creek watersheds (primarily in the central and northwestern Black Hills south and west of Deadwood, north and west of Hill City and east of the Wyoming and South Dakota state line). This area was chosen because it encompasses the ecosystem components of where the known occurrences are located. A larger area would include lower elevation and warmer and drier ecosystem components which includes a different suite of species than what is documented to occur with the species.

Petasites sagittatus has been documented on sites under private ownership and management (Allen et al. 2005, Glisson 2003b). No information is available concerning the present status of these occurrences. Other privately owned lands within the Forest boundary may also provide suitable associated habitat conditions and occurrences, but data concerning the species' presence and distribution on these lands is unavailable.

Since some *Petasites sagittatus* occurrences are located on gentle gradients along streams within meadows or valley bottoms, some areas can be readily accessed by an increasingly popular recreational activity that is referred to as Off Road Vehicle Use (often using All Terrain Vehicles). One of the larger *P. sagittatus* occurrences is located in the Black Fox Botanical Area and Black Fox Valley. Since being designated as Botanical Areas, general Forest direction for these areas is designed to target management at conserving or enhancing botanical features in these areas (see Management Area 3.1 in the 1997 LRMP). However, there are actions or events that can adversely affect conservation of these features within Botanical Areas. Although dispersed Off Road Vehicle Use has been and is currently prohibited within the designated Botanical Areas (and is to continue under the Phase II Amendment decision no matter which alternative is selected), unauthorized trespass of Off Road Vehicle use occurred within the Black Fox Botanical Area both in 2004 and in spring of 2005 and visual effects are still evident. At this time, it is unknown if the unauthorized use may have affected *P. sagittatus* directly, however, the ruts left by Off Road Vehicles can be expected to have altered the directional flows of water (altered the hydrological system) thereby affecting the microsite conditions of Black Fox Valley. It is unknown how this may have affected *P. sagittatus* at this location.

There is concern that this species, like other boreal remnant species with a limited number of occurrences on the Forest, may be highly susceptible to changing current and future climatic conditions, in spite of any actions targeted at their conservation. Due to the small number of individuals at some occurrences on the Forest, random stochastic events (for example, drought or fire) could eradicate an occurrence. When all five alternatives and information specific to the species is considered, the most conservation opportunities and protection for *Petasites sagittatus* is considered to be afforded under Alternatives 3 and 6, as described above. Therefore it is expected that the least risk to the long-term persistence of this species would be through the full implementation of those alternatives. Alternative 4 also targets conservation and protection, but the alternative takes a more passive approach (primarily focuses on more natural processes) for species rather than taking more aggressive actions if needed, therefore it is assumed that more risk to the species persistence could be expected to be associated with this alternative. The No Action Alternatives (Alternatives 1 and 2) do not include additional measures for SOLC and it is expected that the reduction of risks to the species long-term persistence would be the lowest in these alternatives, however, monitoring of the species would still be targeted.

Figure 3-12. General Distribution Of *Petasites Sagittatus* On Lands Administered By The Black Hills National Forest



3-3.2.3.9. Northern Hollyfern (*Polystichum lonchitis*)

Affected Environment

Polystichum lonchitis is disjunct on the Black Hills from western Wyoming. The Forest has information on 20 records for this species in the Black Hills; 19 records from lands administered by the Forest and one record from private land (USDA Forest Service 2005a). Reported sites are located in the northern Black Hills and Bearlodge Mountains (Lawrence County, South Dakota; Crook County, Wyoming).

A circumboreal and subalpine forest fern, *Polystichum lonchitis* occurs in rock crevices and at the base of boulders, mostly in boreal and subalpine coniferous forests or alpine regions (Flora of North America Editorial Committee 1993). *P. lonchitis* is also commonly associated with *Picea glauca* (white spruce), *Betula papyrifera* (paper birch), and *Corylus cornuta* (beaked hazel). On the Black Hills National Forest, *P. lonchitis* is associated with moist, shaded, north facing slopes in forested ravines and gulches on limestone substrates at elevations from 4,160 to 5,540 feet (Allen et al. 2005, USDA Forest Service 2005a). Some occurrences consist of one or few individuals, others have dozens to greater than 50 (USDA Forest Service 2005a), and the largest occurrence in Griggs and Higgins Gulches is estimated to have a couple hundred individuals (Allen et al. 2005). The most recent sites (nine) were located in 2002 and 2003 (USDA Forest Service 2005a). Some report records lack information regarding abundance and total size estimates. No monitoring data are available regarding the status of some of the earlier reported occurrences.

Polystichum lonchitis reports are from the following Management Areas (MA):

MA 3.1 – Botanical Areas – Approximately 35 percent of the total reports are from this MA. Reports are from three of the designated Forest Botanical Areas (BA): Upper Sand Creek BA (1 report), Bear/Beaver Gulch BA (4 reports), and Higgins Gulch BA (2 reports).

MA 4.2A – Spearfish Canyon – Approximately 5 percent of the reports are from this MA.

MA 3.7 – Late Successional Forest Landscapes – Approximately 15 percent of the reports are from this MA.

MA 5.1 – Resource Production Emphasis – Approximately 15 percent of the reports are from this MA.

MA 5.4 – Big Game Winter Range Emphasis – Approximately 25 percent of the reports are from this MA.

Private Land – Approximately 5 percent of the reports are from private land.

This fern is currently assigned a rank of critically imperiled (S1) in South Dakota and as imperiled (S2) in Wyoming (NatureServe 2005). The global rank for *Polystichum lonchitis* is demonstrably secure (G5) (NatureServe 2005).

Direct And Indirect Effects

The species' persistence in the Black Hills is primarily limited by the small extent of cool, moist boreal habitat although it appears to be secure on the Forest at this time. As with other boreal remnant species, long-term drought or dramatic climate changes characterized by drier and warmer conditions may present the greatest risk to *Polystichum lonchitis* and its habitat. However, since additional occurrences have been located in recent years that now document approximately 20 occurrences spread across eight sixth-order watersheds the species is considered to be more secure than what was known about the species previously.

There are a relatively limited number of individuals at a number of the known occurrences where disturbances at occupied sites could likely pose risks to occurrence persistence. However, a few of the new discovered sites (discovered in 2002 and 2003) are estimated to have a couple hundred individuals (Griggs and Higgins Gulches locations). Risks that have been identified as being of most likely potential for this species include Off Road Vehicle impacts, livestock trampling, water developments, and activities associated with road construction (Allen et al. 2005). As is associated with many boreal remnant species, it is likely that climatic change, such as drought, could be expected to be a risk to this species persistence on the Black Hills. It is also expected that noxious weeds and other non-native plant species invasions could be expected to be a risk. Wildfire and suppression activities can be considered a risk to occurrences. Collectors may desire the species and depending on the level of interest, collection could potentially present a risk to this species.

There are several objectives, standards, and guidelines regarding the management of *Picea glauca* (white spruce) vegetation communities and the restoration of hardwood (includes aspen and birch) areas. Restoration and vegetation management (including commercial harvest) activities designed to contribute to conditions to allow *P. glauca* (white spruce) stands to progress toward late successional conditions may promote the maintenance or enhancement of conditions (cool and shady) for *Polystichum lonchitis* in the long term.

There are some seeps and springs located on side slopes or along small side drainages in the vicinity or support some *Polystichum lonchitis* occurrences in the Black Hills. Guideline 3104 provides for the conservation of sensitive species (does not specify SOLC) habitats when springs or seeps are developed as water facilities in Alternative 1. In Alternative 2, development of springs and seeps as water facilities is prohibited. Alternatives 3 and 6 alters and strengthens Guideline 3104 to a standard, and includes SOLC while prohibiting the development of springs and seeps as water facilities unless that development mitigates an existing risk. In Alternative 4, this guideline also becomes a standard, and areas where moist soil conditions exist should be avoided or conserved, and development of springs or seeps where sensitive species exist (does not include SOLC) would be prohibited. By altering 3104 to a standard in Alternatives 3 and 6 and including SOLC, it is expected that it would be less likely that there would be risks to *P. lonchitis* from water development activities on the Forest. Therefore, the assumption is that there would be a greater likelihood in those Alternatives that hydrologic function of seeps and springs would be conserved, thereby allowing for the continued contribution of moisture to support long-term persistence of where *P. lonchitis* occurs.

Livestock use has been observed at some locations and *Polystichum lonchitis* occurrences are located in active range allotments on the Forest, therefore it is likely that specific indirect and direct effects are occurring from this activity at some of the occurrence locations. The degree that effects may be realized to this species would be expected to depend on the degree and intensity of actual grazing, trampling, trailing, water structure access and other use of its saturated habitats, as well as to whether livestock would be able to access occurrences since some locations are described as occurring within rock crevices and cattle would not be expected to access those occurrences or individuals. Guidelines 2505 and 2505d in Alternatives 1, 3, and 4, direct the level of grazing in riparian areas to be managed by the project level Allotment Management Plan (AMP) or through the project level Annual Operating Instructions (AOI) to permittees, based on range conditions, season of use, and the residual height of key species (such as *P. lonchitis*). Guideline 2505 is strengthened to a standard in Alternatives 2, 3 and 6. Guideline 2505c in Alternative 1, is a standard in Alternatives 2, 3, 4, and 6, and limits grazing to 40 percent of the leaders produced during the year (this will require active monitoring), which would also be expected to limit the adverse effects of plant trampling and potential alterations to hydrologic function that may result from the prolonged presence of cattle or other livestock use. Guideline 2507 in Alternative 1 and Standard 2507 in Alternative 2 and 4 specifies the level of use during grazing to not more than 50 percent of the

current growth of forage before August 1 and to no more than 30 percent of the current growth after August 2 in Alternative 1. In Alternatives 3 and 6, 2507 is strengthened to a standard and allows grazing in riparian areas only as long as it meets the objective of maintaining, enhancing, or conserving the conditions of the riparian ecosystem and emphasis species persistence. It is assumed that implementation would be expected to include early removal of livestock use or not occur at all in those locations if needed to target conservation of emphasis species persistence at those sites, therefore it is assumed that if implemented as described, Alternatives 3 and 6 (designated preferred alternative) could be expected to provide more conservation for riparian associated species, such as *P. lonchitis*, followed by Alternative 4 and Alternative 2, with the most risk to species likelihood of persistence with livestock use associated with Alternative 1. In addition, approximately 35 percent of the *P. lonchitis* reports are from designated Botanical Areas (Upper Sand Creek, Bear/Beaver and Higgins Botanical Areas).

All alternatives target various levels of conservation and protection for SOLC plants from noxious weed invasion and treatment. As with other plant species associated with riparian systems (or saturated soils), a primary concern would be the invasion of purple loosestrife into areas where *Polystichum lonchitis* is located because if it invades any of the areas, it is very aggressive and has the potential to impact wetland sites and their associated plant species. The assumption is that Alternatives 3, 4, and 6 would have a greater reduction in risk of indirect and direct impacts to *P. lonchitis* from noxious weeds and their treatment since they place emphasis of actions at SOLC plants. Objective 231 is included in all alternatives to target prevention and reduction of noxious weed invasion into native plant communities. In Alternatives 1 and 2, the targeted objective is to treat 3,600 acres per year. Targeted treatment acres are increased to 6,000 acres per year in Alternatives 3 and 4, and increased to a minimum of 8,000 acres in Alternative 6. Guideline 4303 is revised in Alternatives 3, 4, and 6 to require that occurrence locations of SOLC plants, along with Region 2 sensitive plant species, are priority areas for treatment of noxious weeds. Guideline 4304 (Alternatives 1 and 2) was revised and strengthened to a standard in Alternatives 3, 4, and 6. This would be expected to provide more protection to *P. lonchitis* by requiring use of treatment methods that pose the least risk to the species. Standard 4300-01 specifies monitoring of weed control effectiveness at SOLC sites to determine if weeds at those sites need to be re-treated throughout the season to reduce noxious weed competition, and was included in Alternatives 3, 4, and 6 to further address the risk that noxious weeds present to SOLC plant species. Alternatives 1 and 2 are silent on the monitoring of weed control effectiveness at SOLC plant locations. Alternatives 1 and 2 require the use of certified noxious weed-free seed, feed and mulch on the Forest (Standard 4306). This standard was revised in Alternatives 3, 4, and 6 to require that the seed be tested at time of purchase to confirm that the seed is weed-free. Prevention of noxious weed invasion into native plant communities is further targeted by revegetating with native species which is included as a Guideline (1110) in Alternatives 1 and 2. The original guideline was revised and was strengthened to a standard in Alternatives 3, 4, and 6 (Standard 1110). Further discussion on Noxious Weeds as related to implementation of the various Phase II Amendment alternatives can be found in Section 3-7.3 of the FEIS.

While reporting occurrences of rare plants has been ongoing for many years, recent emphasis (primarily since 2000) has been placed on targeting and reporting *Polystichum lonchitis* occurrences during plant surveys completed on the Forest. Monitoring to be completed for Forest SOLC has been included in Chapter 4 of the LRMP (see Monitoring Item Species of Local Concern). The type and level of information being collected for monitoring this species is available in the Black Hills Monitoring Implementation Guide (USDA Forest Service 2005f). In general, as identified in the design for this species, the focus for the monitoring seasons immediately following the Phase II Amendment ROD is to attempt to relocate the previously reported locations. If reported areas are relocated, the current design includes the gathering of quantitative and qualitative baseline data and assessing risks at occurrences that are relocated.

It is unknown if this species may ever be targeted for collection. Although this species does not have a showy flower that may be targeted by collectors, various fern species are used in the floral industry. Standard 3119 is included in Alternatives 3 and 6 to restrict the collection of SOLC plants (or parts thereof) to only those needed for scientific or educational purposes, or as recognized for American Indian traditions (Standard 7103). This would prohibit collecting for both personal (other than for American Indian traditional uses) and commercial uses, thereby limiting the associated direct effects of plants removed from occurrences. It is unknown how many plants would be used for American Indian traditional uses; however, they have indicated at meetings that their interests are in maintaining plant species that have traditional uses. Although uncertain, the assumption is that traditional uses and scientific collections may be expected to directly affect individual plants, it is not expected that this type of collection would present much risk to the overall long-term persistence of this species on the Black Hills National Forest.

Although dense spruce cover may enhance shade and longer snow and moisture retention at the currently known occurrences, the continuity of highly flammable, dense conifer stands (pine and spruce) adjacent to *Polystichum lonchitis* sites is of concern. Large tracts of dense conifers may lead to widespread, high intensity wildfires that could negatively affect *P. lonchitis* sites. Prescribed fire or fuel-reduction activities are subject to environmental (NEPA) analysis at the project level. Wildfire and fire containment measures are considered a potential risk to *P. lonchitis* occurrences. Where currently known occurrences are bordered by continuous, dense conifer stands, cutting firebreaks and implementing other fuel reduction activities that would result in crown fires dropping to the ground before fires burn into known sites would be expected to benefit the species by reducing the likelihood that stand-replacing events would extirpate those occurrences. Tree removal in surrounding uplands could have the added benefit of providing increased moisture to the sites. Objective 200-5 was included in Alternative 3 to create or maintain a low crown-fire hazard adjacent to occurrences of Region 2 Sensitive and SOLC plants and Botanical Areas bordered by continuous, dense conifer stands where long-term persistence is at risk from a single high intensity fire. However, since there are approximately 20 occurrence locations dispersed across eight sixth-order watersheds it is not considered likely that a high intensity wildfire would affect all occurrences. Implementation of this objective near *P. lonchitis* occurrences is expected to decrease fire effects and benefit occurrences during fire events. Based on other priority emphasis, Alternative 6 is less aggressive in terms of this conservation measure by only targeting creation or maintenance of a moderate-to-low crown-fire hazard adjacent to these species occurrences so the risk of crown fire that could reach occurrences would be expected to be greater. Alternatives 1, 2, and 4 do not include an objective to reduce fire hazard around occurrence locations and the risk of occurrence loss is highest in these alternatives. Therefore it is expected that full implementation of Alternative 3 would be expected to reduce fire risk in proximity to occurrences to the greatest extent of any of the Phase II Alternatives.

Since two of the *Polystichum lonchitis* reported locations are located within the estimated 1.5-mile WUI circumference area of the designated Savoy At Risk Community (ARC), it is likely that Objective 200-5 could be achieved near those sites in conjunction with fuels reduction efforts near ARCs (refer to Appendix G, Map G-6: At-risk Communities and Wildland-urban Interface) that has been included in Alternative 6. However, various areas can be expected to receive treatment under all alternatives because of the tie to the legislation (refer to Appendix B of the FEIS for discussion of ARCs and the WUI for more information). There is a great deal of uncertainty on any effects statements regarding treatments around ARCs and *P. lonchitis* because without a priority system or a map indicating which ARCs are targeted first or to what level, it is not known if any treatments would even occur within the immediate vicinity of occurrences.

Some *Polystichum lonchitis* occurrences are located within MAs 5.1 and 5.4. The majority of changes targeted at the conservation of SOLC long-term persistence is provided in the overall Forest-wide direction rather than in specific management area direction such as for those where the occurrences are

located. Most changes in management area direction for MAs 5.1 and 5.4 are associated with ponderosa pine structural stage direction. The assumption is that these structural stage targeted activities would be designed to occur across planning unit areas, such as watersheds, and would not be expected to conflict with targeting reduction of fire risk, as described in the previous paragraphs, near *P. lonchitis* occurrences. Therefore these structural stage change objectives associated with ponderosa pine stands (a different ecological type than what the species is associated with) would generally be expected to have little change in beneficial or negative effects to *P. lonchitis* as compared to existing Forest Plan direction.

None of the currently known *Polystichum lonchitis* occurrences are located within any of the candidate RNAs, therefore no beneficial or negative effects are expected to be associated with any that may be proposed for designation in the Phase II Amendment decision.

Cumulative Effects

The indirect and cumulative effects analysis for species persistence is bounded in time as the next 50 years. This temporal scale is based on: a) the planning horizon (usually 50 years for a Forest plan); b) the biology of the species (e.g., generation time, response time to changed conditions, recolonization capability); and c) the time needed for the overall ecosystem to respond to proposed management (Liggett et al. 2003).

The spatial scale for cumulative effects analysis of Phase II Amendment alternatives for this plant species is smaller than generally encompasses the Black Hills Ecoregion as defined by Bailey (1995). The spatial area used for the cumulative effects analysis for *Polystichum lonchitis* primarily includes areas from approximately 4,100 feet and above in elevation in the northwestern portion of the Black Hills and the Bearlodge Mountains in the Redwater River, Lower Belle Fourche River, and Upper Bell Fourche River watersheds. This area was chosen because it encompasses the ecosystem components of where the known occurrences are located. A larger area would include other geologic types and lower elevation and warmer and drier ecosystem components which include a different suite of species than what is documented to occur with the species.

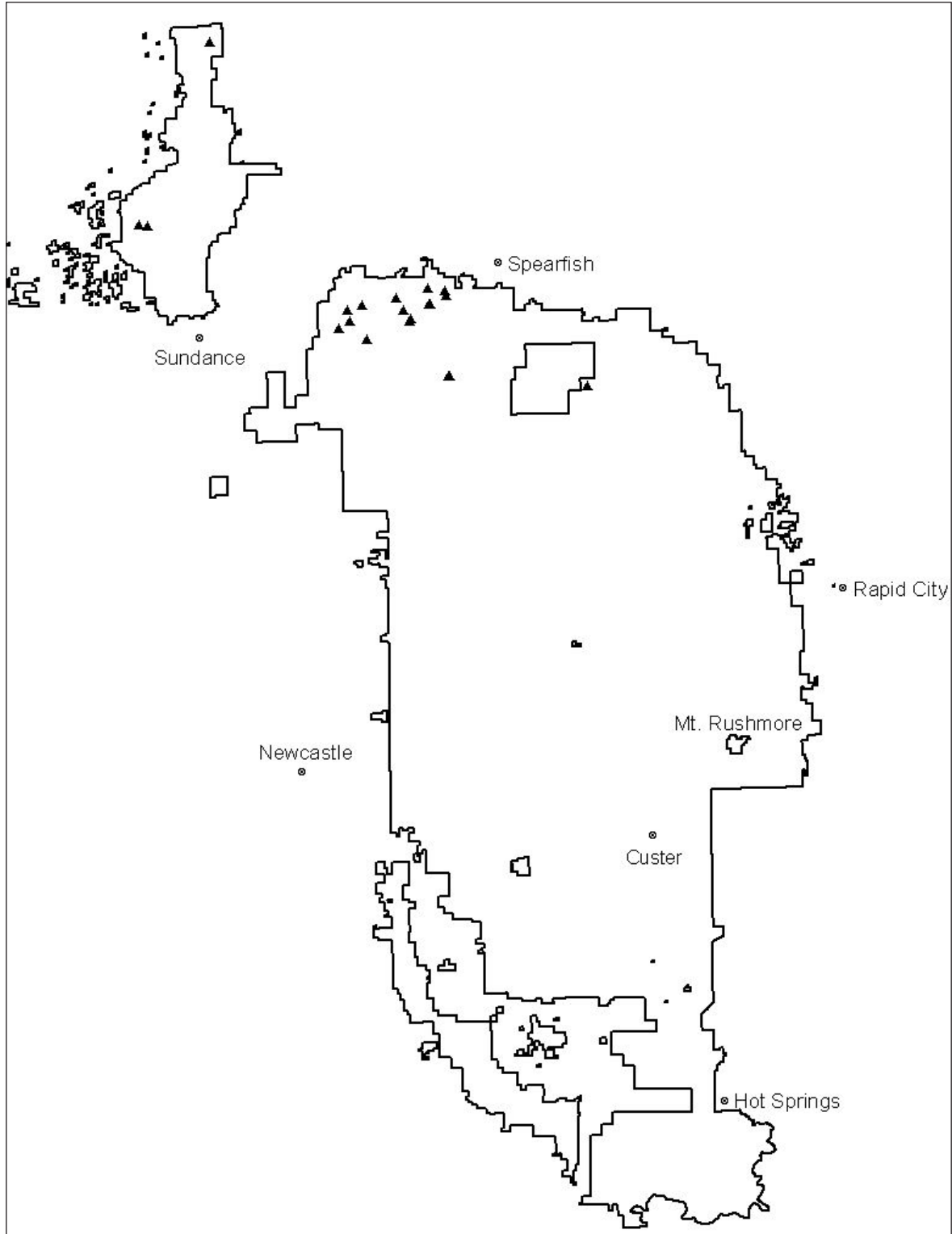
It is known that some privately owned land within the Forest boundary also provide suitable habitat conditions for this species since approximately 5 percent of the reports in the Forest database are from private lands. Activities on those lands are unknown, however, it is expected that some of the lands would likely be developed and *Polystichum lonchitis* occurrences on those lands could be at risk from the effects associated with development activities (such as building of structures, road development, placement of septic systems, well drilling, fuel reduction activities near structure, etc.).

Current Forest wide objectives, standards, and guidelines are similar among alternatives, but more are included or are strengthened to include a focus for SOLC under Alternatives 3 and 6. However, since Alternatives 3, 4, and 6 specifically provide direction for SOLC as compared to Alternatives 1 and 2, it is assumed that full implementation of objectives, standards, and guidelines in Alternatives 3, 4, and 6 would be expected to target the greatest conservation and is expected to present the least risk to this species long-term persistence from management actions.

In summary, objectives, standards, and guidelines included in Phase II Action Alternatives (3, 4 and 6) target conservation or protection to reduce the potential of risks to long-term persistence of SOLC such as *Polystichum lonchitis*. Alternatives 3 and 6 take a more active approach to targeting conditions aimed at protecting occurrences and Botanical Areas where approximately 35 percent of this species occurrences are located (such as reducing the likelihood of high intensity fire from consuming occurrences or Botanical Areas). Although Alternative 4 takes a more passive approach and does not target risks associated with fire, this alternative would be expected to likely provide benefits to this species since it is

associated with later successional conditions, which is a target of Alternative 4. Conservation measures that would likely provide future benefits to the long-term persistence of Forest *P. lonchitis* occurrences are expected to include the maintenance of spruce, riparian restoration, restrictions of developing springs and seeps as water developments, species monitoring and prioritization of noxious weed control efforts at emphasis plant species locations. Therefore, the least risks to the species persistence are expected in Alternatives 3 and 6, followed by Alternative 4. Most risks to the species persistence would be expected to be associated with the selection of Alternatives 1 or 2, since neither of those two alternatives specifically includes SOLC.

Figure 3-13. General Distribution Of *Polystichum Lonchitis* On Lands Administered By The Black Hills National Forest



3-3.2.3.10. Shining Willow (*Salix lucida*)

Affected Environment

Salix lucida (subsp. *caudata*) is widely distributed in the western and northern United States and Canada (USDA Natural Resources Conservation Service 2004). This shrub was historically documented (1913) from the Black Hills but was never relocated and was thought to be no longer present until an individual was located at another location along a small tributary of Iron Creek in 1993 (Larson and Johnson 1999). Since that time, three additional occurrences have been located. There are four occurrences of *Salix lucida* currently known on lands administered by the Black Hills National Forest. Two of these are located in the Bearlodge Mountains north of Sundance, Wyoming. The other two occurrences are located within the central granitic core area of the Black Hills, northeast of Custer, South Dakota. The three other occurrences were discovered in 2002 and 2003 (USDA Forest Service 2005a). All occurrences were discovered during plant surveys that were completed on the Black Hills National Forest.

This widespread species is commonly associated with streambanks, shores, wet meadows, and seeps and is considered a facultative wetland plant in South Dakota and eastern Wyoming (USDA Natural Resources Conservation Service 2004). *Salix lucida* is a shrub or small tree up to 4 meters in height. The catkins of *S. lucida* emerge in May and produce seed in June (Great Plains Flora Association 1986). This species is reported to produce low amounts of seed, have a slow seed spread rate, have low seedling vigor, and to have a slow vegetative spread rate (USDA Natural Resources Conservation Service 2004).

Within the Black Hills, two occurrences are documented within the Bear Lodge Mountains (Bearlodge Ranger District) and two occurrences are located within the granitic core area on the eastern side of the Forest (Hell Canyon Ranger District). The occurrences within the Bear lodge Mountains (Crook County, Wyoming) are located at some of the lower elevations (4200 and 4800 feet) of the Black Hills National Forest and these occurrences are located approximately 3 miles from each other. Occurrences within the granitic core (Pennington County, South Dakota) are located at mid elevations (5,000 and 5600) within the Black Hills and are approximately 6 miles distant of each other. Individuals are reported to occur in open (full sun) to partially shaded conditions. Less than five individual plants are reported at each of the occurrence locations (USDA Forest Service 2005a). The 1993 location was described as a male individual and at that time it was unknown if a seed-producing population existed within the Black Hills. Plants located at the new sites have been described as vegetative individuals, so it is still unknown if there is a seed-producing population within the Black Hills with potential for seed production (Allen et al. 2005).

Salix lucida individuals are located within the following designated Forest Management Areas (MA):

MA 1.1A – Black Elk Wilderness – one occurrence is documented within this MA (within the recent Wilderness expansion area which had been in MA 5.4A).

MA 5.4 – Big Game Winter Range Emphasis – two occurrences are documented in the Bearlodge Mountains within this MA.

MA 5.4A – Norbeck Wildlife Preserve – one occurrence is located within this MA (immediately adjacent to the Black Elk Wilderness boundary).

Salix lucida is considered to be globally secure as indicated by the assigned rank (G5). The currently assigned rank in South Dakota is that critically imperiled (S1). The species has not been assigned a status rank in Wyoming (NatureServe 2005).

Direct And Indirect Effects

The currently known distribution of *Salix lucida* on the Forest is limited to the four occurrences listed above. The long-term persistence of *S. lucida* in the Black Hills is uncertain since what is currently known about the occurrences is that less than a total of 10 individuals are known to exist. Baseline data is currently unavailable for these occurrences, therefore it is unknown if it is likely that individuals at these locations can be conserved to contribute towards the long-term persistence of this species in the Black Hills. Since only four occurrences of *S. lucida* have been documented on the Forest with a limited number of individuals it is assumed that the specific microsite conditions that are associated with this species may be very limited within the broader more general riparian conditions which occur across the Forest. Since four occurrences are known this species is considered to be vulnerable to catastrophic and stochastic events. Because this is an facultative (USDA NRCS 2004) wetland species, the primary risk to its persistence and reproductive success is likely considered to be any lowering of the water table where it occurs, whether it is natural or human induced. Noxious weeds and other non-native invasive plants, invading woody species (conifer encroachment), fungal infections or insect infestations are likely to pose concern for this species. Little information has been documented for noxious weed species at the occurrence locations. However, *Lythrum salicaria* (purple loosestrife) is a very aggressive invasive plant species and has the potential to outcompete riparian natives, including *S. lucida*.

Since the greatest risk to this species in the Black Hills may be associated with disturbance events, such as high intensity fires, flooding, disease or insect infestations, successful collection and retention of plant material may present the greatest reduction in risk to the persistence of this species on the Black Hills. Objective 200-04 was designed into Alternatives 3, 4, and 6 for the Phase II Amendment to target the conservation of species such as *Salix lucida* with a limited number of occurrences, where the Black Hills population is expected to be at a higher risk from loss of occurrences to intense disturbance events. This objective targets the collection of material from Black Hills plant species individuals for reintroduction efforts into occurrence sites that were lost to these events, and where it is likely that reintroduction efforts would be expected to be successful. This material could also be used for expanding limited population size locations (which would be all of the currently known Forest *S. lucida* sites) which could also potentially be expected to contribute to the long-term persistence of this species. No direction for collection of emphasis plant species material is included within Alternatives 1 and 2.

Alternatives 3 and 6 would be expected to be more beneficial to riparian areas than the other alternatives and may, therefore, provide more long-term opportunities for conservation or expansion of this species within the Black Hills. Alternative 3 targets doubling the acres of restored riparian shrub communities on the Forest (Objective 214) over Alternatives 1, 2, 4, and 6. Alternatives 3 and 6 also target a minimum of five stream reaches be rehabilitated (Objective 215), compared with three stream reaches in Alternatives 1, 2, and 4. If either of these activities would occur upstream of the currently known *Salix lucida* locations it is expected that over the long term these actions could contribute to the maintenance or the increase of saturated conditions at the occurrence locations and would be expected to potentially benefit *S. lucida*. Although sites are unknown, if these actions would take place at locations with microsite conditions suitable for the species, successful long-term restoration with greater soil moisture conditions may provide colonization conditions for the species.

Objective 200-01 in Alternatives 3 was designed to address a variety of risks associated with conifer encroachment for a number of the emphasis plant species. *Salix lucida* is reported in areas with open to partially shaded conditions and a beaver dam was listed as an associated condition at one of the locations in the Bearlodge Mountains, therefore it is expected that hardwood retention or regeneration could be expected to benefit this species and that conifer encroachment could present greater risks to the species. Objective 200-01 was designed to favor hardwood restoration where spruce has encroached into hardwoods and where beaver reoccupation is desired to target conservation of the species. The

removal of conifers (including spruce) at *S. lucida* sites, with the intent of rejuvenating aspen for the long-term reoccupation by beaver to conserve and enhance saturated conditions, could be expected to be a primary contributing factor to reduce the risk and potentially benefit the species' long-term persistence. Objective 200-01 in Alternative 6 indicates that a treatment of spruce is to occur, however, at least 20,000 acres of spruce is to be managed for under the alternative and it is uncertain that spruce encroachment removal desired at or adjacent to emphasis plant species locations, such as *S. lucida* can be achieved. Therefore it is not known if Alternative 6 would be as successful at targeting this conservation measure for emphasis plant species as Alternative 3. No version of this objective is included in Alternatives 1, 2, and 4. Alternative 2 and 4 directs maintenance of existing patch size of white spruce structural stages (Standard 3215), which could be expected to significantly limit or prohibit the likelihood of hardwood restoration activities identified as beneficial for the long-term persistence of some emphasis plant species, such as *S. lucida*. This standard was revised for Alternatives 3 and 6 and identifies maintenance of canopy closures (40 to 50 percent) for marten corridors. Although not specified in the standard and actual site implementation is uncertain, it is assumed that this canopy closure would be composed primarily of conifer species rather than hardwoods. Therefore, in order to provide for other species associated with hardwoods, it is assumed that at the project design and implementation level that the connectivity corridor design and placement would include consideration of hardwood restoration and could still provide beneficial effects for long-term persistence of species such as *S. lucida*. Alternative 1 does not specifically address the removal of spruce encroachment into hardwoods or maintenance of canopy connectivity corridors (see section on marten in Appendix C for more information on spruce and connectivity corridors).

All alternatives target various levels of conservation and protection for SOLC plants from noxious-weed invasion and treatment. The assumption is that Alternatives 3, 4, and 6 would have a greater reduction in risk of indirect and direct impacts to *Salix lucida* from noxious weeds and their treatment. Objective 231 is included in all alternatives to target prevention and reduction of noxious-weed invasion into native plant communities. In Alternatives 1 and 2, the targeted objective is to treat 3,600 acres per year. Targeted treatment acres are increased to 6,000 acres per year in Alternatives 3 and 4, and increased to a minimum target of 8,000 acres per year in Alternative 6. Guideline 4303 is revised in Alternatives 3, 4, and 6 to specify that occurrences of SOLC, along with Region 2 sensitive species, are the priority for treatment of noxious weeds on the Forest. Guideline 4304 (Alternatives 1 and 2) was revised and strengthened to a standard in Alternatives 3, 4, and 6. This would be expected to provide more protection to *S. lucida* by requiring use of treatment methods that pose the least risk to the species. Standard 4300-01 specifies monitoring of weed control effectiveness at SOLC sites to determine if weeds at those sites need to be retreated throughout the season to reduce noxious weed competition, and was included in Alternatives 3, 4, and 6 to further address the risk that noxious weeds present to SOLC plant species. No Action Alternatives (Alternatives 1 and 2) do not include monitoring weed treatment effectiveness at SOLC plant locations. Alternatives 1 and 2 require the use of certified noxious weed-free seed, feed and mulch on the Forest (Standard 4306). This standard was revised in Alternatives 3, 4, and 6 to require that the seed be tested at time of purchase to confirm that the seed is weed-free. Prevention of noxious weed invasion is further targeted in native plant communities by revegetating with native species and is included as a guideline (1110) in Alternatives 1 and 2. The original guideline was revised and was strengthened to a standard in Alternatives 3, 4, and 6 (Standard 1110). Further discussion on Noxious Weeds as related to implementation of the various Phase II Amendment alternatives can be found in Section 3-7.3 of the Final EIS.

The occurrences within the granitic core area are located within the Black Elk Wilderness and within an area of the Norbeck Wildlife Preserve where livestock are not currently authorized, therefore two of the four occurrences are not within an area that would ever be expected to be affected by permitted livestock. The two single individual occurrences within the Bearlodge Mountains are located within the

Farrall Allotment. Grazing was documented at one of the occurrences within the Bearlodge Mountains but no information on grazing was included for the other occurrence location (USDA Forest Service 2005a). If Alternative 3 or 6 were selected through the Phase II Amendment decision, implementation of those alternatives would remove any direct effects to the currently known *S. lucida* occurrences (or to occurrences as they may be discovered during plant surveys) based on Standard 2505e. Implementation of this standard would not allow any utilization by livestock at any known occurrences of willow emphasis species, including *S. lucida*. This standard is not included in Alternatives 1, 2, or 4; therefore direct effects to *S. lucida* from livestock could be expected to occur under those alternatives. It is unknown if there may be other undiscovered locations of *S. lucida* on Forest lands, therefore it is unknown if any effects may be associated with livestock use. However, there is further direction that would be expected to contribute to lower risks to potentially unknown occurrences of the species, since it is recognized that livestock do present risks to some willow species. Standards 1306 and 1505 and Guidelines 1303 and 9108 (all alternatives) would be expected to contribute towards the maintenance or conservation of the integrity of existing riparian areas from authorized activities on Forest Service administered lands, such as timber management, mining, roads, recreation, livestock use, and vehicle use. Guidelines 2505 and 2507 (Alternatives 1, 2, and 4) target the management of grazing in riparian areas to a residual objective; under Alternatives 3 and 6 these guidelines are strengthened to standards to target the objective of conserving or enhancing riparian habitat conditions. Therefore, it is expected that indirect and direct effects to *S. lucida* from livestock use would be the least under Alternatives 3 and 6.

While reporting occurrences of rare plants has been ongoing for many years, recent emphasis (primarily since 2000) has been placed on targeting and reporting *Salix lucida* occurrences during plant surveys completed on the Forest. Monitoring to be completed for Forest SOLC has been included in Chapter 4 of the LRMP (see Monitoring Item SOLC). The type and level of information being collected for monitoring this species is available in the Black Hills Monitoring Implementation Guide (USDA Forest Service 2005f). In general, as identified in the design for this species, the focus for the monitoring seasons immediately following the Phase II Amendment ROD is to attempt to relocate the previously reported locations. If reported areas are relocated, the current design includes the gathering of quantitative and qualitative baseline data and assessing risks at occurrences that are relocated.

None of the currently known *Salix lucida* occurrences are located within any of the designated Black Hills At Risk Communities (ARC), therefore no beneficial or negative effects are expected to be associated with any that may be proposed for designation in the Phase II Amendment decision.

None of the currently known *Salix lucida* occurrences are located within any of the candidate RNAs, therefore no beneficial or negative effects are expected to be associated with any that may be proposed for designation in the Phase II Amendment decision.

Cumulative Effects

The indirect and cumulative effects analysis for species persistence is bounded in time as the next 50 years. This temporal scale is based on: a) the planning horizon (usually 50 years for a Forest plan); b) the biology of the species (e.g., generation time, response time to changed conditions, recolonization capability); and c) the time needed for the overall ecosystem to respond to proposed management (Liggett et al. 2003).

The spatial scale for cumulative effects analysis of Phase II Amendment alternatives for this plant species is the area generally encompassed by the Black Hills Ecoregion as defined by Bailey (1995). The spatial scale is further limited to the Bear Lodge Mountains area north of Sundance and the central granitic core region to the east and north of Custer. This area was chosen because it encompasses the ecosystem components of where the known occurrences are located.

This willow had not been reported since 1913 and was thought to be no longer present on the Black Hills until it was reported approximately 80 years later in the granitic core area of the Black Hills (Larson and Johnson 1999). Based on the four currently known *Salix lucida* locations (combined total of individuals is currently reported as less than 20) on land administered by the Forest, the species' future is considered to be precarious.

Section 3-2.3 Riparian and Wetland Ecosystems of the FEIS provides information on various types of riparian systems located in the Black Hills and on factors that have contributed to altered hydrological conditions and fragmentation of riparian habitat. These alterations have contributed to systems that now function differently than how they would have functioned historically. These altered systems can be observed on lands administered by the Forest, as well as on lands administered by other agencies and riparian systems located on lands under private ownership. Although unknown, it is likely that those types of alterations have affected seed dispersal and sprouting conditions for this species, as well as extent and distribution of associated microsite habitat conditions suitable for *Salix lucida* establishment and persistence within the Black Hills.

No private land is located immediately adjacent upstream or downstream of the two *Salix lucida* occurrences in the central Black Hills. Based on the distance and that the private land is located downstream, it is considered unlikely that private land activities would be expected to contribute any adverse or beneficial effects to the two occurrences within Norbeck Wildlife Preserve and the Black Elk Wilderness. The two occurrences within the Bearlodge Mountain are located just upstream of adjacent to private land. It is unknown if human activities or private land development or diversions that may occur downstream of these occurrences would be expected to affect the levels of saturated conditions at those Bearlodge *S. lucida* occurrences. It is important to recognize that natural catastrophic events that could affect saturated conditions of occurrence locations or place stress on willow plants, such as droughts, could be expected to offset or negate the effects of any current conservation management actions, or management actions, as they would be expected to occur under the Phase II Amendment alternatives.

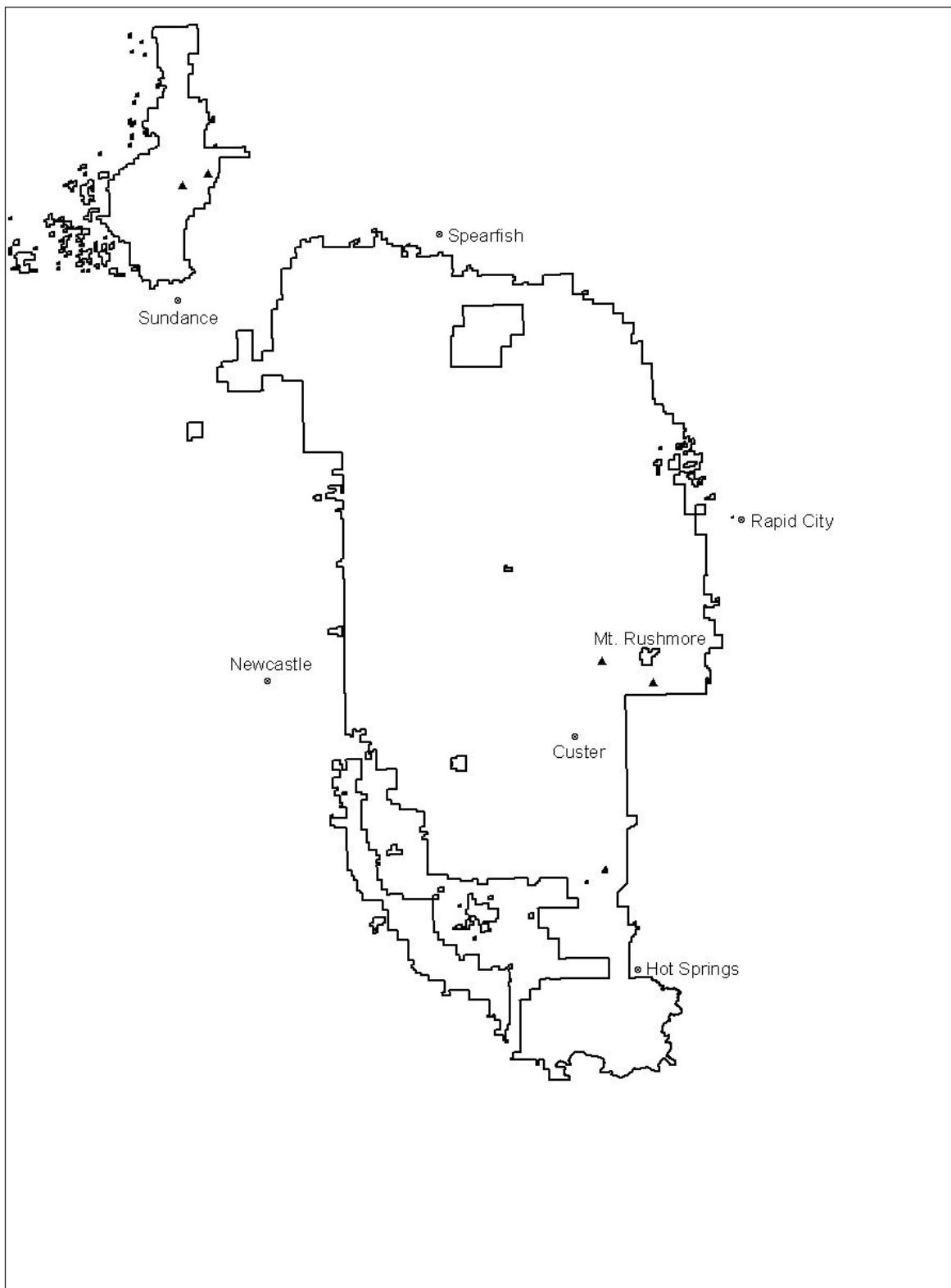
It is possible that lands administered by Mount Rushmore National Memorial and Custer State Park that are located near the occurrences in the granitic core have suitable habitat conditions for *Salix lucida*, but no occurrences are currently known from those areas.

Effects on *Salix lucida* were discussed in the section based on the current locations of designated ARC (refer to Map G-6 in Appendix G: At-risk Communities and Wildland-urban Interface). This map is subject to change with the potential that more areas could likely be designated as ARC (see Appendix B of the FEIS for discussion of ARC and the WUI), with fuel reduction actions to occur within an estimated 1.5-mile WUI circumference area around those designated areas. It is uncertain how this expected revision of the list will result in changes in placement of or levels of treatments around species occurrences and how effects would be expected to change.

It should be recognized that no matter what management actions take place, persistence of this species is uncertain based on four occurrences with a limited number of individuals, along with the uncertainty of a seed-producing population, which when combined lends the species to a greater vulnerability to loss from stochastic events (e.g., drought, fire). When all five alternatives and information specific to the species is considered, the most conservation opportunities and protection for *Salix lucida* is considered to be afforded under Alternatives 3 and 6, as described above. Therefore it is expected that the least risk to the long-term persistence of this species would be through the full implementation of those alternatives. Alternative 4 also targets conservation and protection, but the alternative takes a more passive approach (primarily focuses on more natural processes) for species rather than taking more aggressive actions if

needed, therefore it is assumed that more risk to the species persistence could be expected to be associated with this alternative. The No Action Alternatives (Alternatives 1 and 2) do not include additional measures for SOLC and it is expected that the reduction of risks to the species long-term persistence would be the lowest in these alternatives, however, monitoring of the species would still be expected to be targeted.

Figure 3-14. General Distribution Of *Salix Lucida* On Lands Administered By The Black Hills National Forest



3-3.3. Fauna

The following sections consider members of the animal community that have been identified as emphasis species for consideration in this EIS. These include threatened and endangered species, Region 2 sensitive species, SOLC, and MIS.

The indirect and cumulative effects analysis for species viability is bounded in time as the next 50 years. This temporal scale is based on: a) the planning horizon (usually 50 years for a Forest plan); b) the biology of the species (e.g., generation time, response time to changed conditions, recolonization capability); and c) the time needed for the overall ecosystem to respond to proposed management (Liggett et al. 2003).

For wildlife species, the spatial scale for cumulative effects analysis of Phase II Amendment alternatives generally encompasses the Black Hills Ecoregion as defined by Bailey (1995). This area was chosen because it encompasses similar ecosystem components and species that occur on the Black Hills National Forest. A larger area would include the surrounding plains, which includes a vastly different suite of species and ecosystem components.

The cumulative effects analysis for fish species is bounded in space as the fourth-order watersheds that encompass the Forest. This equates to the headwaters of the Belle Fourche and Cheyenne rivers, and their associated tributaries, downstream to the Belle Fourche/Cheyenne River confluence. This bounding was determined because effects to water quality and/or quantity from Forest Service activities may extend downstream of the Forest boundary but become negligible at a downstream point due to the underlying Black Hills geology and the overriding effects of other non-Forest activities at an ever-increasing watershed/geographic scale.

3-3.3.1. Threatened And Endangered Species

The following table includes threatened and endangered species located on the Black Hills National Forest or located adjacent to or downstream of the project area that could potentially be affected. These species were identified through informal consultation with the South Dakota and Wyoming Field Offices of the USDI Fish and Wildlife Service (USFWS). A Biological Assessment has been prepared for threatened and endangered species and is included in Appendix C. **Table 3-16** below summarizes the effects determination for these species from the Biological Assessment.

Table 3-16. Determination For Threatened And Endangered Species

Common Name	Alternatives				
	1	2	3	4	6
Bald Eagle <i>Haliaeetus leucocephalus</i>	May affect, not likely to adversely affect	May affect, not likely to adversely affect	May affect, not likely to adversely affect	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Black-footed ferret <i>Mustela nigripes</i>	No effect	No effect	No effect	No effect	No effect
Gray Wolf <i>Canis lupus</i>	WY – Not likely to jeopardize continued existence or modify proposed habitat SD – No Effect	WY – Not likely to jeopardize continued existence or modify proposed habitat SD – No Effect	WY – Not likely to jeopardize continued existence or modify proposed habitat SD – No Effect	WY – Not likely to jeopardize continued existence or modify proposed habitat SD – No Effect	WY – Not likely to jeopardize continued existence or modify proposed habitat SD – No Effect

3-3.3.1.1. Bald Eagle

The 1996 Final Environmental Impact Statement (EIS) Biological Assessment/Biological Evaluation (BA/BE) (USDA Forest Service 1996a Appendix H) gives an overview of distribution and life history for the bald eagle, and is incorporated here by reference.

Bald eagles are present in the Black Hills during winter, usually arriving in early November (USDA Forest Service 1996a Appendix H) and leaving by March or April. The bald eagle was formerly a rare breeder in the southeastern portion of South Dakota (South Dakota Ornithologist's Union 1991). In 1993, the first successful bald eagle nesting attempt in South Dakota in over a century was documented (South Dakota Department of Agriculture 2004). As of April 2004, there were 32 active bald eagle nests in South Dakota or on the Nebraska side of the Missouri River along the shared river boundary (South Dakota Department of Game, Fish and Parks 2004). Forest personnel record observations of bald eagles, including nesting activity. No nesting has been documented on the Forest, but an unsuccessful nesting attempt was reported adjacent to the Forest in the Southern Hills in spring 2004. (Staab 2004, pers. comm.). Most suitable nesting habitat occurs around the major reservoirs or along major creeks in the Black Hill. In Wyoming, the bald eagle is an uncommon resident that nests in the western, north-central, and southwestern portion of the state (Luce et al. 1999).

The bald eagle is currently listed as federally threatened. In July 1999, the USFWS proposed to delist the bald eagle in the lower 48 states; a final decision is pending.

Key winter habitat components for the bald eagle on the Forest include perch sites, roost sites away from human disturbance, and an adequate food supply (USDA Forest Service 1996a Appendix H). The Forest has done no formal roost site surveys, but Forest personnel cover the Forest in the course of other duties. Bald eagle concentrations are also of public interest and would likely be reported by Forest users. There

are no known traditional roost sites in the Black Hills, but the ponderosa pine landscape, particularly structural stages 4A, 4B, and 5, with up to 70-percent canopy closure, provides suitable roosting habitat (USDA Forest Service 1996a Appendix H). The environmental baseline is further described in the Forested Ecosystems section in Chapter 3 of the DEIS.

Large concentrations of wintering eagles are not expected to occur on the Forest due to the winter freezing of reservoirs, but a small population of eagles does winter on the Black Hills. This small population appears to rely mainly on a dependable supply of carrion, especially deer and small mammals killed by vehicle traffic. Bald eagles are frequently observed feeding on carcasses along roads (USDA Forest Service 1996a Appendix H). There is no bald eagle critical habitat delineated by the USFWS on the Forest.

Direct and Indirect Effects

Potential impacts from Forest activities could include disturbance at roost or nest sites, changes in prey availability, and impacts to forested habitats used for roosting, nesting, and perching. Power line electrocution also has the potential to affect bald eagles.

Direct effects to this species are not anticipated. No bald eagles currently nest on the Forest. In the event of future nesting on the Forest, the death or injury of adults, eggs or young during the breeding season is unlikely because of protective measures and the low probability of a nest tree inadvertently being felled, given this species high visibility. Standard 3101 prohibits the use of selected chemicals that may indirectly result in eggshell thinning. Standard 3101 in Alternatives 1, 2, and 6 avoids harassment by prohibiting new disturbance that may affect nesting success. In all alternatives, Standard 3204 protects known raptor nests. Standard 3100-01 more explicitly defines buffer distances and protective seasons to protect bald eagle nests under Alternatives 3 and 4. Protective dates and distances in Standards 3100-01 (Alternatives 3 and 4) and 3101 (Alternatives 1, 2, and 6) are based on USDI Fish and Wildlife Service (1999) guidelines and Wyoming dates for raptor protection.

All Alternatives have conservation measures to avoid adverse effects due to overhead transmission lines. Guideline 8303 advises that new or reconstructed electrical utility lines (less than 33 kilovolt) be buried when feasible. This guideline is treated as a standard in Alternative 2. In Alternatives 1 and 4, Guideline 8308 encourages the replacement or reconfiguration during normal replacement schedules of existing unsafe power line poles in high probability raptor habitat. This guideline is treated as a standard in Alternative 2. This becomes a standard in Alternatives 3 and 6 and is modified to require the replacement or reconfiguration with raptor safe designs as soon as possible in areas with identified raptor electrocution problems. Standard 8309, common to all Alternatives, requires raptor protections for new electric lines and pole construction. The best guidance on raptor-safe practices is contained in the Avian Power Line Interaction Committee's (1996) Suggested Practices for Raptor Protection on Power Lines. No bald eagle electrocutions resulting from overhead transmission lines have been recorded on the Forest.

Ponderosa pine is the dominant cover type on the Forest; therefore, the analysis focuses on bald eagle habitat parameters within ponderosa pine forests. Total potential roosting habitat; defined here as ponderosa pine forests in structural stages 4A, 4B, and 5; indicate an anticipated decline under all alternatives. However, potential roosting habitat will likely remain above 500,000 acres for all alternatives. Vegetation treatments around large reservoirs such as Pactola, Sheridan and Deerfield, emphasize scenic values that retain large trees for aesthetic reasons limiting the loss of perch or roost trees. The quantity of bald eagle roosting habitat on the Forest does not appear to be a limiting factor in any of the alternatives.

Vehicle-killed wildlife is a major food source for wintering bald eagles on the Forest. In general, vehicular collisions with deer are highest on state or federal roads and provide the bulk of carrion upon which eagles feed. Highways where deer carcasses are common have abundant roosting habitat in close proximity. Only in areas where highways cross interior prairies is potential roosting and perching habitat not adjacent to high volume highways. Differences or changes in vehicle traffic among alternatives are negligible.

Vegetation-management activities may disrupt bald eagles at perch or resting sites. Treatments near the WUI have a greater potential to affect the bald eagle because the WUI generally includes or is adjacent to riparian/aquatic habitat that attracts bald eagles. Human activities or dwellings within the WUI may limit the use of these areas by bald eagles. Under all alternatives, impacts to wintering bald eagles are minimized by Standard 3101 which avoids timber harvest activities in stands being used by bald eagles.

Standard 3100-08 (Alternative 3) directs that all federally listed threatened, endangered, and proposed species be recorded and reported to the appropriate USFWS office. This direction is a repetition of current policy and would occur under all alternatives.

No direct effects to the species are anticipated. Indirect effects to the species will be negligible because an adequate amount of roosting habitat will be maintained under all alternatives. In addition, there are specific Forest-wide objectives, standards, and guidelines designed to conserve and maintain habitat suitable for nesting. Prey species and availability are likely to be maintained at current levels. Alternative 3, 4, and 6 are expected to have the least potential for effects because they include explicitly defined buffer distances and protective seasons to protect bald eagle nests and traditional roost sites, should they be discovered on the Forest in the Future. Alternatives 1 and 2 do not include these measures and offer more potential risk.

Cumulative Effects

Cumulative effects result from the incremental impact (direct and indirect effects) associated with the alternatives when added to past, present and reasonably foreseeable actions. Past activities on NFS lands in the Black Hills are accounted for in the existing condition displayed under direct and indirect effects. Other Federal and non-Federal activities are discussed here.

Management in the national and state parks within or adjacent to the Forest would have little cumulative effect on wintering bald eagles because habitat conditions on these lands are less subject to modification from commodity production or extraction. Suitable roost trees exist on private in-holdings, National Park Service lands, and Custer State Park to supplement the number of roost trees on the Forest. Human activity may limit roosting on some of these non-NFS lands. There are no known future state, tribal, or private actions considered “reasonably certain to occur” that may affect bald eagles in the Black Hills.

Alternative 3, 4, and 6 are expected to have the least potential for effects because they include explicitly defined buffer distances and protective seasons to protect bald eagle nests and traditional roost sites, should they be discovered on the Forest in the Future. Alternatives 1 and 2 do not include these measures and offer more potential risk.

3-3.3.1.2. Black-Footed Ferret

The 1996 Final EIS BA/BE (USDA Forest Service 1996a Appendix H) gives an overview of distribution and life history for the black-footed ferret and is incorporated here by reference.

Black-footed ferrets are federally endangered throughout their former range. In Wyoming, there are historic records of ferrets in the Black Hills area (Luce et al. 1999). The closest known population of ferrets in Wyoming is part of a reintroduction program in the central portion of the state. The black-footed ferret was extirpated from South Dakota and has been reintroduced to the Badlands National Park and Buffalo Gap National Grasslands east of the Black Hills.

The black-footed ferret is a nocturnal, solitary carnivore with the narrowest range of ecological tolerance of any North American predatory mammal (USDA Forest Service 1996a Appendix H). In the Black Hills, as elsewhere, the key habitat component for black-footed ferrets is the distribution and abundance of prairie dogs (Forrest et al. 1985), its primary food source. Vacated prairie dog burrows also provide shelter.

Based on 2003 monitoring data, the Forest currently has approximately 265 acres of occupied black-tailed prairie dog habitat, consisting of five active colonies, the largest being 151 acres (USDA Forest Service 2003j). The three largest towns total 256 acres. The two remaining towns are small and extensions of towns on private lands. The 2003 acreage represents a 20-percent increase over the estimated acreage of 222 acres in 2002, and a 260-percent increase from observations in 1992 (USDA Forest Service 2004a). The potential for prairie dog expansion on the Forest is limited because prairie dog towns on the Forest quickly reach private land or encounter rocky soils that make burrowing difficult. Large areas (greater than 1,000 acres) of potentially suitable prairie dog habitat are not present on the Forest.

Previous BA/BE documents for the Forest (USDA Forest Service 1996a Appendix H, 2001c) discuss the acreage of prairie dog colonies recommended to support black-footed ferret reintroduction programs. These reports conclude that since acreage of prairie dog colonies on the Forest are too small to support reintroduction of black-footed ferrets; they are inadequate to support a population of ferrets. However, USFWS guidelines (USDI Fish and Wildlife Service 1989) recommend that black-tailed prairie dog towns or complexes greater than 81 acres be surveyed for the presence of black-footed ferrets before determining effects on the species. Black-tailed prairie dog towns or complexes of fewer than 81 acres having no neighboring prairie dog towns may be developed or treated without ferret surveys. Prairie dog towns in Wyoming were block cleared in 2004 and ferret surveys are no longer recommended.

Direct and Indirect Effects

There is historical evidence for black-footed ferret presence in the Black Hills area, although they have not been seen for several decades. There is little expectation that ferrets will be found on the Forest, so the likelihood of direct effects are negligible. Ferrets would probably need to be translocated in order to establish a population. Since there is insufficient prairie dog town habitat, according to reintroduction guidelines, reintroduction is unlikely.

Because black-footed ferrets are associated with prairie dog complexes and prairie environments, differences among the alternatives in forested ecosystem management are unlikely to have an effect on potential habitat. All alternatives, however, do contain guidance for restoring grassland habitats. Alternatives 1, 2, and 4 specify restoration guidelines (a 10-percent increase over 1995 conditions) for grassland communities (montane meadows and prairies). Alternatives 3 and 6 would increase the extent of grassland habitats by restoring 12,000 acres of prairie grasslands.

Under Alternative 3, Objective 200-09 aims for low grassland structure in the vicinity of prairie dog towns. In Alternative 6, Objective 200-09 manages for 200 to 300 acres of prairie dog towns in at least three colonies. Objective 200-09 in Alternative 6 was based on current conditions: the three largest towns on the Forest total about 256 acres and the other towns are small and are extensions of towns on private land. Maintenance of the smaller towns may be dependant on activities on adjacent private lands.

These objectives, however, would have no impact on the feasibility of introducing ferrets on the Forest. The potential for prairie dog expansion on the Forest is limited because prairie dog towns on the Forest quickly reach private land or encounter rocky soils that make burrowing difficult. Some expansion of existing towns may occur or new towns may be discovered, but large areas (greater than 1,000 acres) of potentially suitable prairie dog habitat are not expected to be present on the Forest.

Standard 3118 in Alternatives 2 and 4 emphasize maintenance of prairie dog towns, whereas in Alternatives 3 it prohibits major soil disturbance activities in prairie dog towns. In Alternatives 3, 4 and 6, Standard 3100-3 minimizes the availability of perching structures for avian predators in or near prairie dog towns.

Alternatives 2, 3, 4, and 6 provide more extensive protection measures for prairie dog populations at existing levels; whereas, Alternative 1 does not emphasize maintaining the existing prairie dog population. Alternative 6 is the only alternative that provides a measurable management objective for acres of prairie dog towns.

Black-footed ferrets do not currently exist in the Black Hills region, potential habitat is limited, and habitat conservation and restoration efforts would not appreciably enhance the area suitable for ferrets. Implementation of the Phase II Amendment, regardless of the alternative, would have no impact on black-footed ferrets.

Black-footed ferrets are not known to occur in the Black Hills. Potential suitable ferret habitat on the Forest is marginal due to the limited acreage and isolated distribution of prairie dog towns. Potentially suitable habitat does not meet the criteria for possible reintroduction. Even with the implementation of grassland habitat and prairie dog town protections and enhancements, the Forest is unlikely to support a population of black-footed ferrets.

Cumulative Effects

Cumulative effects result from the incremental impact (direct and indirect effects) associated with the alternatives when added to past, present and reasonably foreseeable actions. Past activities on NFS lands in the Black Hills are accounted for in the existing condition displayed under direct and indirect effects. Other Federal and non-Federal activities are discussed here.

The only lands with potential to support black-footed ferret populations are found in the southern Black Hills. Both Wind Cave National Park and Custer State Park are located in this southern forested-prairie ecotone and contain prairie dog towns. Wind Cave National Park has considered ferret introductions, but no introductions are planned at this time. If ferrets are successfully introduced into Wind Cave National Park in the future, some individuals could disperse to prairie dog towns on the Forest. Management of existing prairie dog colonies and grassland restoration on the Forest is not likely to create additional suitable habitat for ferret reintroduction on the Forest or on adjacent Custer State Park or Wind Cave National Park lands. Prairie dog towns on the Forest will likely continue to be inadequate for supporting a ferret population. Information on prairie dog towns on private lands in the area is limited. There are no known future state, tribal, or private actions considered “reasonably certain to occur” that may affect black-footed ferrets in the Black Hills. No cumulative effects are anticipated under any alternative.

3-3.3.1.3. Gray Wolf

Historically, the northern Rocky Mountain population of the gray wolf (*Canis lupus irremotus*) occurred throughout all or portions of Washington, Oregon, Idaho, Montana, Wyoming, and western South Dakota, including the Black Hills (USDI Fish and Wildlife Service 1987). These wolves were extirpated from Wyoming, South Dakota, and other portions of their range by the mid-20th century.

The USDI Fish and Wildlife Service recently established three distinct population segments (DPS) of the gray wolf in the lower 48 states; two of these apply to the Black Hills (USDI Fish and Wildlife Service 2003a). The Eastern DPS includes North and South Dakota, Minnesota, Nebraska, Kansas, and other states to the east of these mentioned (USDI Fish and Wildlife Service 2003b). The Western DPS includes all or portions of Wyoming, Utah, Colorado, and other western areas (USDI Fish and Wildlife Service 2003c). Although Wyoming is within the Western DPS, it also holds experimental nonessential population status, meaning separate regulations apply. Because the Black Hills straddle the Wyoming-South Dakota border, both Eastern DPS and experimental nonessential population regulations apply.

The Northern Rocky Mountain Wolf Recovery Plan sets forth recovery objectives for the wolf population in Wyoming and other parts of the Western DPS (USDI Fish and Wildlife Service 1987). As part of this recovery plan, wolves were reintroduced into Yellowstone National Park in 1995 and 1996 as an experimental nonessential population. Recovery objectives have been met in the Yellowstone recovery area and the entire Western DPS, (USDI Fish and Wildlife Service 2004b). As of December 2003, there were 14 packs documented in Yellowstone Park, with an additional 10 packs outside the Park in Wyoming (USDI Fish and Wildlife Service et al. 2004a). This exceeds recovery plan objectives. The closest documented wolves to the Black Hills that occur in Wyoming are near Tensleep, on the western slope of the Bighorn Mountains. The two to three dispersing wolves seen there in 2003 were not considered an established pack (USDI Fish and Wildlife Service et al. 2004a). One of the Tensleep wolves was legally killed in response to livestock depredations.

Due to the success of the wolf recovery program in the West, the USDI Fish and Wildlife Service intends to propose delisting the Western DPS (including the experimental nonessential population) as soon as state management plans are approved in the affected states (Wyoming, Montana and Idaho) (USDI Fish and Wildlife Service 2003c). Currently, Wyoming is the only state without an approved plan (USDI Fish and Wildlife Service 2004a).

The thrust of the Eastern DPS recovery program occurs in Minnesota, Wisconsin, and Michigan. This program has also been very successful, which has led the USDI Fish and Wildlife Service downlist the wolf from endangered to threatened status (USDI Fish and Wildlife Service 2003b). This threatened status applies in South Dakota. Recovery objectives have been met, and the USDI Fish and Wildlife Service has announced intent to delist the Eastern DPS of the gray wolf (USDI Fish and Wildlife Service 2003b).

Historically, wolves occupied a wide range of habitats. Availability of prey, particularly large ungulates, was probably the main factor affecting their abundance and distribution. Conflicts between humans and wolves, particularly related to livestock, led to widespread lethal control of wolves. Human tolerance (or lack thereof) of wolves has now become the main factor controlling the abundance and distribution of wolves in the United States.

Increasing numbers of wolves in the United States has led to an increase in dispersal of mostly young wolves. In some situations, subordinate wolves may disperse hundreds of miles (Van Camp and Gluckie 1979); however, mortality is often high among dispersing animals. Thus, the chances of finding a mate and successfully establishing a new pack are low (USDI Fish and Wildlife Service 1987).

Recent wolf reports in North and South Dakota are thought to be of lone dispersers originating from Minnesota (USDI Fish and Wildlife Service 2000). There has been one reported wolf sighting on the Forest; it occurred during November 2001 (M. Kintigh pers. com. 2001). However, the potential for the establishment of a viable and self-sustaining wolf population anywhere in North or South Dakota is considered low (USDI Fish and Wildlife Service 2000).

An established pack or population in the Black Hills is not required for recovery or delisting either the Eastern or Western DPS. In fact, the USDI Fish and Wildlife Service has acknowledged that South Dakota lacks significant recovery potential for the gray wolf in South Dakota, and has stated that even lethal depredation control activities to protect livestock would not slow the recovery or delisting of the Eastern DPS (USDI Fish and Wildlife Service 2000). There is an approved plan to respond to depredation issues in South Dakota that entails removal of offending wolves. Although lethal control is not the preferred method of removal, it could be used under some circumstances.

The Black Hills contain a suitable prey base of resident elk, white-tailed deer, and mule deer (USDA Forest Service 1996a). The populated nature of this area, in conjunction with dominant agricultural uses, greatly reduce the likelihood that human tolerance of wolves would be high enough to allow even dispersing individuals to remain here even if natural prey exist.

Direct and Indirect Effects

It is unknown whether wolves will recolonize the Black Hills on their own. The USDI Fish and Wildlife Service has no plans to reintroduce wolves here; in fact, they have acknowledged that South Dakota lacks significant recovery potential for the gray wolf, and even lethal depredation control activities would not slow the recovery or delisting of the eastern DPS (USDI Fish and Wildlife Service 2000).

A suitable prey base for gray wolves does exist on the Forest. Objective 217, which is the same for all alternatives, would maintain habitat for game populations in the event that wolf recovery objectives or expectations were to change. If wolves were to recolonize the Black Hills, management direction would be evaluated at that time.

Gray wolves are not known to occur in the Black Hills, except for an occasional dispersing individual. The USDI Fish and Wildlife Service has acknowledged that South Dakota lacks significant recovery potential for the gray wolf. Population objectives have been met in Wyoming, and no packs are desired or expected in the eastern portion of the state. Therefore, Forest management direction would have no effect on the gray wolf under any alternative.

Cumulative Effects

Cumulative effects result from the incremental impact (direct and indirect effects) associated with the alternatives when added to past, present and reasonably foreseeable actions. Past activities on NFS lands in the Black Hills are accounted for in the existing condition displayed under direct and indirect effects. Other Federal and non-Federal activities are discussed here.

Widespread livestock production and expanding urban development both provide conditions that are detrimental to the successful establishment of wolves in the Black Hills. However, in the event that recovery objectives or expectations were to change, state management of big game on and off the Forest would likely ensure a suitable prey population for wolves. No cumulative effects are expected under all alternatives.

3-3.3.2. Region 2 Sensitive Species

Sensitive species are those plant and animal species identified by the Regional Forester for which population viability is currently of concern as evidenced by significant current or predicted downward trends in population numbers or density or by significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution (FSM 2670.5 Parts 19a and b). Sensitive species are evaluated in detail in Appendix C. The effects determinations for Region 2 sensitive fauna are summarized below.

The following Region 2 Sensitive Species have a determination of “**No Impact**” for all alternatives:

- Plains minnow (*Hybognathus placitus*)
- Sturgeon chub (*Macrhybopsis gelida*)
- Ferruginous hawk (*Buteo regalis*)
- Mountain plover (*Charadrius montanus*)
- Northern harrier (*Circus cyaneus*)
- Peregrine falcon (*Falco peregrinus*)
- River otter (*Lontra canadensis*)
- Swift fox (*Vulpes velox*)

The following Region 2 Sensitive Species have a determination of “**may adversely impact individuals, but not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing**” for all alternatives:

- Cooper's mountainsnail (*Oreohelix strigosa cooperi*)
- Regal fritillary (*Speyeria idalia*)
- Finescale dace (*Phoxinus neogaeus*)
- Lake chub (*Couesius plumbeus*)
- Mountain sucker (*Catostomus platyrhynchus*)
- Northern leopard frog (*Rana pipiens*)
- Black Hills redbelly snake (*Storeria occipitomaculata pahasapa*)
- Black-backed woodpecker (*Picoides arcticus*)
- Burrowing owl (*Athene cunicularia*)
- Flammulated owl (*Otus flammeolus*)
- Grasshopper sparrow (*Ammodramus savannarum*)
- Lewis' woodpecker (*Melanerpes lewis*)
- Loggerhead shrike (*Lanius ludovicianus*)
- Northern goshawk (*Accipiter gentilis*)
- Three-toed woodpecker (*Picoides dorsalis*)
- Yellow-billed cuckoo (*Coccyzus americanus*)
- Black-tailed prairie dog (*Cynomys ludovicianus*)
- American marten (*Martes americana*)

- Fringed myotis (*Myotis thysanodes*)
- Townsend's big-eared bat (*Corynorhinus townsendii pallescens*)