Thunder Basin 2020 Plan Amendment

Biological Evaluation of Plant Species and Report on the Preliminary List of Potential Plant Species of Conservation Concern

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for:
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I. Introduction

The purpose of this biological evaluation is to analyze and determine the likely effects of the alternatives on federally listed species (endangered, threatened, and proposed), Forest Service sensitive species (FSM 2670.31-2670.32) and species of local concern.

This Biological Evaluation (BE) conforms to legal requirements set forth under section 7 of the Endangered Species Act (ESA) (19 U.S.C. 1536 (c), 50 CFR 402.12 (f) and 402.14). Section 7(a) (1) of the ESA requires Federal agencies to use their authorities to further the conservation of listed species. Section 7(a) (2) requires that Federal agencies ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of federally-listed species, or destroy or adversely modify designated critical habitat.

Forest Service policy requires that a review of programs and activities, through a biological evaluation (BE), be conducted to determine their potential effect on threatened and endangered species, species proposed for listing, and sensitive species (FSM 2670.3). Under the ESA, a Biological Assessment (BA) must be prepared for Federal actions that are "major construction activities" to evaluate the potential effects of the proposal on listed or proposed species. The contents of the BA are at the discretion of the Federal agency, and will depend on the nature of the Federal action (50 CFR 402.12(f)). A BE may be used to satisfy the ESA requirement to prepare a Biological Assessment. Preparation of a Biological Evaluation as part of the NEPA process ensures that TEPS species receive full consideration in the decision-making process.

II. Description of the Proposal

For a detailed description of the proposed action and each of the alternatives, please see the 2020 Thunder Basin National Grassland Plan Amendment Scoping Document dated April 17, 2019, and the Thunder Basin 2020 Plan Amendment Issues and Alternatives Memo dated July 8, 2019.

Purpose and Need

In recent years, dramatic changes in prairie dog populations and increasing conflicts have indicated the need to change the grassland plan to allow Federal land managers to be more responsive to a variety of environmental and social conditions.

The purpose of this proposed plan amendment is to:

- provide a wider array of management options to respond to changing conditions;
- minimize prairie dog encroachment onto non-Federal lands;
- reduce resource conflicts related to prairie dog occupancy and livestock grazing;
- ensure continued conservation of at-risk species; and
- support ecological conditions that do not preclude reintroduction of the black-footed ferret.

Specifically, an amendment is needed to:

- revise management direction in Management Area 3.63 – Black-Footed Ferret Reintroduction Habitat,
- adjust the boundaries of management area 3.63 to be more conducive to prairie dog management;

- increase the availability of lethal prairie dog control tools to improve responsiveness to a variety of management situations, including those that arise due to encroachment of prairie dogs on neighboring lands, natural and human-caused disturbances, and disease.

Alternatives

Based on review of public comments and concerns, the interdisciplinary team developed three action alternatives that will be analyzed in detail in the environmental impact statement in addition to the no-action alternative. Specific major components of the alternatives are in Table D-1, full descriptions are available in the final environmental impact statement.

III. Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information focuses on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives. Table D-1 compares the major components of each alternative and Figure D-1 through Figure D-5 are maps of the delineation of management area 3.67 and the Cheyenne River Special Interest Area for each alternative.

Table D-1. Comparison of major elements of alternatives

Major Management Elements	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Grassland-wide	Alternative 4 Prairie Dog Emphasis	Alternative 5 Preferred Alternative
Management area 3.63 or 3.67	Management Area 3.63 – Black-Footed Ferret Reintroduction Habitat is approximately 51,000 acres in size, and the Cheyenne River Zoological Special Interest Area is approximately 5,900 acres.	Management Area 3.63 – Black-Footed Ferret Reintroduction Habitat would be changed to Management Area 3.67 – Rangelands with Short-Stature Vegetation Emphasis. Management area size would change from approximately 51,000 to approximately 35,000 acres. Cheyenne River Zoological Special Interest Area would be redrawn to follow the Cheyenne River along the southeastern border of management area 3.67. Special interest area management direction would be updated to reflect emphasis on riparian habitat. Special interest area size would change from approximately 5,900 to approximately 3,800 acres.	Management Area 3.63 – Black-Footed Ferret Reintroduction Habitat would be changed to Management Area 3.67 – Rangelands with Short-Stature Vegetation Emphasis. Management area size would change from approximately 51,000 to approximately 29,000 acres. Cheyenne River Zoological Special Interest Area would be redrawn to follow the Cheyenne River along the southeastern border of management area 3.67 and Antelope Creek along the southwestern border of management area 3.67. Special interest area management direction would be updated to reflect emphasis on riparian habitat. Special interest area size would change from approximately 5,900 to approximately 5,700 acres.	Management Area 3.63 – Black-Footed Ferret Reintroduction Habitat would be changed to Management Area 3.67 – Prairie Dog Emphasis Area. Management area 3.67 and Cheyenne River Zoological Special Interest Area boundaries would remain the same as current.	Management Area 3.63 – Black-Footed Ferret Reintroduction Habitat would be changed to Management Area 3.67 – Short-Stature Vegetation Emphasis. Management area size would change from approximately 51,000 to approximately 42,000 acres. Cheyenne River Special Interest Area would be redrawn to follow the Cheyenne River and Antelope Creek along the southeastern border of management area 3.67 and renamed Cheyenne River-Antelope Creek Zoological Special Interest Area. Special interest area management direction would be updated to reflect emphasis on riparian habitat. Special interest area size would change from approximately 5,900 to approximately 5,300 acres.

Major Management Elements	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Grassland-wide	Alternative 4 Prairie Dog Emphasis	Alternative 5 Preferred Alternative
Prairie dog colony acre objective and distribution	Prairie dog colonies and acreage objectives managed based on 2015 management strategy categories: Category 1: 18,000 acres Category 2: 9,000 acres Category 3: 6,000 acres	Prairie dog colonies would be managed toward an objective of 10,000 acres within management area 3.67. No complexes would be required or designated in standards or guidelines, but desired conditions for management area 3.67 would describe that within management area 3.67, colonies within approximately 4.5 miles (7 kilometers) of other colonies are maintained, when possible, to develop colony complexes.	Prairie dog colonies across the grassland would be managed within a range of 10,000 to 15,000 acres. Colonies located anywhere on national grassland would count toward acre range. One 1,500-acre complex would be required and managed for in management area 3.67, and a guideline would direct management for colonies of 200 to 500 acres to provide optimal nesting habitat for mountain plover.	Prairie dog colonies and acreage objectives managed based on 2015 management strategy categories: Category 1 would remain the same—18,000-acre objective. Category 2 areas would be modified, but would keep the 9,000-acre total objective. Category 3 acreage objectives would be removed. Management area 3.67 would be managed for two 4,500-acre complexes.	Prairie dog colonies would be managed toward an acreage objective of 10,000 acres within management area 3.67.
Boundary management zone	No boundary management zone, but may allow rodenticide use if colony is within ½ mile of boundary, under certain circumstances.	¼-mile boundary management zone in management area 3.67. A temporary ¾-mile boundary management zone may be granted under special circumstances. Rodenticide use allowed in boundary management zone regardless of colony acres.	¼-mile grassland-wide. A temporary 1-mile boundary management zone may be granted under special circumstances. Rodenticide use allowed in boundary management zone regardless of colony acres.	¼-mile boundary management zone for category 1; 1/8-mile boundary management zone for category 2. Rodenticide use allowed in boundary management zone regardless of colony acres.	¼-mile boundary management zone in management area 3.67. A temporary ¾-mile boundary management zone may be granted under special circumstances. Rodenticide use allowed in boundary management zone regardless of colony acres.

Major Management Elements	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Grassland-wide	Alternative 4 Prairie Dog Emphasis	Alternative 5 Preferred Alternative
Thresholds for rodenticide use	Many conditions required for use of rodenticide.	If the district ranger determines lethal control in management area 3.67 is warranted, and colony acres are less than the 10,000-acre objective, satellite acres can be identified. If management area 3.67 acres and satellite acres total more than 7,500, interior rodenticide use in management area 3.67 can be allowed down to a 7,500-acre minimum. Rodenticides may be used to maintain satellite colonies at designated size.	When acreage is less than 10,000 acres grassland-wide, rodenticide use allowed only in boundary management zone or for density control.	Unlike the current strategy, when acreage objectives are met, by category, lethal control would be allowed within that category to return to objective acres.	Rodenticide use and other control tools would be allowed in management area 3.67 when colony acreage is above 7,500 acres. Control tools would be allowed outside of management area 3.67 at any time. Priority for control would be for colonies within 1 mile of a residence, colonies impacting facilities, and the boundary management zone. Other control activities would be prioritized annually.
Approved rodenticides	All forms of zinc phosphide approved for use (October 1-December 31), with many conditions. Only allowed in category 1 area within ½ mile of boundary if acreage objective met and nonlethal options tried. Otherwise conditional based on decision screens.	All forms of zinc phosphide approved for use (allowed only October 1-January 31). Management area 3.67 must have at least 7,500 acres of colonies (within management area 3.67 or in designated satellite colonies) for use outside the boundary management zone, unless used for density control. Anticoagulants and fumigants prohibited.	All forms of zinc phosphide approved for use (allowed only October 1-January 31). Must have at least 10,000 acres of colonies for use the outside boundary management zone, unless used for density control. Anticoagulants and fumigants allowed in the boundary management zone only after three applications of zinc phosphide.	All forms of zinc phosphide approved for use (allowed only October 1-January 31). Must meet acreage objectives in category 1 and 2 areas before using outside the boundary management zone. Anticoagulants and fumigants prohibited.	All forms of zinc phosphide approved for use (allowed only October 1-January 31). Management area 3.67 must have at least 7,500 acres of colonies. Fumigants approved for use (allowed only October 1-January 31) in boundary management zone, residence 1-mile buffer, and within ¼ mile of non-Federal land, only after two applications of zinc phosphide.

Major Management Elements	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Grassland-wide	Alternative 4 Prairie Dog Emphasis	Alternative 5 Preferred Alternative
Recreational shooting	Year-round shooting prohibition in management area 3.63 and category 1; conditional restrictions in category 2 areas.	Seasonal restriction (no shooting February 1 to August 15) in management area 3.67, including the boundary management zone and any designated satellite acres. No restrictions on rest of grassland.	No restrictions for prairie dog conservation unless developed as part of complex management plan.	Year-round shooting prohibition in management area 3.67 and category 1. Year-round prohibition in category 2 until acreage objective met, then seasonal restrictions (no shooting February 1 to August 15) in category 2.	Seasonal restriction (no shooting February 1 to August 15) in management area 3.67, including the boundary management zone. No restrictions on rest of grassland.
Drought plan	No specific management changes under drought conditions.	To mitigate prairie dog colony expansion during drought conditions, control tools may be used in active prairie dog colonies to work toward a revised objective of 7,500 acres in management area 3.67 and satellite colonies combined.	To mitigate prairie dog colony expansion during drought conditions, control tools may be used in active prairie dog colonies to work toward an objective of 10,000 acres.	No specific management changes under drought conditions.	To mitigate prairie dog colony expansion during extended drought conditions, control tools may be used to work toward a temporary revised acreage objective of 7,500 acres in management area 3.67.
Plague management	Plague-mitigation tools may be used in active prairie dog colonies.	Plague-mitigation tools may be used in active prairie dog colonies.	Plague-mitigation tools may be used in active prairie dog colonies.	Plague-mitigation tools may be used in active prairie dog colonies.	A plague management plan will be developed, and an integrated approach to plague management (e.g., using tools such as deltamethrin and fipronil) will be implemented annually in management area 3.67. Plague mitigation may also be implemented outside of management area 3.67.

Major Management Elements	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Grassland-wide	Alternative 4 Prairie Dog Emphasis	Alternative 5 Preferred Alternative
Density control	No density control described, but nonlethal density control could be approved.	Density control (for example, using rodenticide, translocation, collapsing burrows) may be used to maintain desired vegetation conditions. Desired vegetation structure and composition may vary by ecological site or colony. When less than 7,500 acres in management area 3.67 and satellite colonies, treat no more than 50 percent of any colony. Where density control occurs, pretreatment data must be collected and monitoring data must be collected for a minimum of 2 years after treatment.	Density control (for example, using rodenticide, translocation, collapsing burrows) may be used to maintain desired vegetation conditions. Desired vegetation structure and composition may vary by ecological site or colony. When less than 10,000 acres, treat no more than 50 percent of any colony. Where density control occurs, pretreatment data must be collected and monitoring data must be collected for a minimum of 2 years after treatment.	No density control described, but nonlethal density control could be approved.	Experimental density control activities may be authorized in colonies (a) outside of management area 3.67 or (b) in management area 3.67 if colony acreages are above 7,500. If scientific information is developed and indicates that density control achieves vegetation or dispersal objectives and maintains habitat for associated species, then density control may be authorized in management area 3.67 when acreages are less than 7,500. Colonies treated for density control would count toward acreage objective.
Strategy and collaborative working group	The 2015 Prairie Dog Conservation Assessment and Management Strategy would remain in effect, with a collaborative stakeholder group in place.	The grassland plan would no longer refer to a separate prairie dog management strategy and the strategy would be rescinded. A collaborative stakeholder group would provide management recommendations to Forest Service staff.	The grassland plan would no longer refer to a separate prairie dog management strategy and the strategy would be rescinded. A collaborative stakeholder group would provide management recommendations to Forest Service staff.	Components of the 2015 Prairie Dog Conservation Assessment and Management Strategy would be integrated into the grassland plan, and the strategy would be rescinded. A collaborative stakeholder group would provide management recommendations to Forest Service staff.	The grassland plan would no longer refer to a separate prairie dog management strategy and the strategy would be rescinded. A collaborative stakeholder group would provide management recommendations to Forest Service staff.

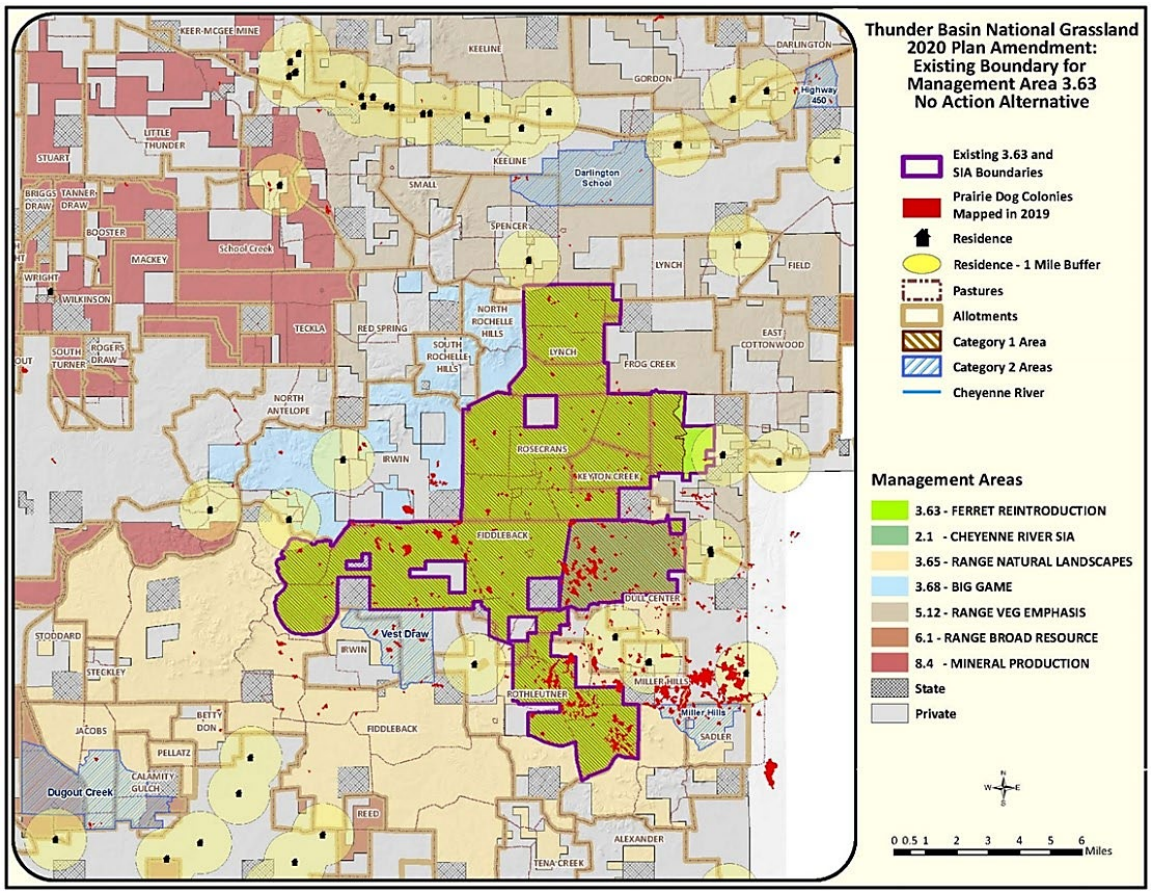

Figure D-1. Delineation of management area 3.67 and the Cheyenne River Special Interest Area for the no-action alternative

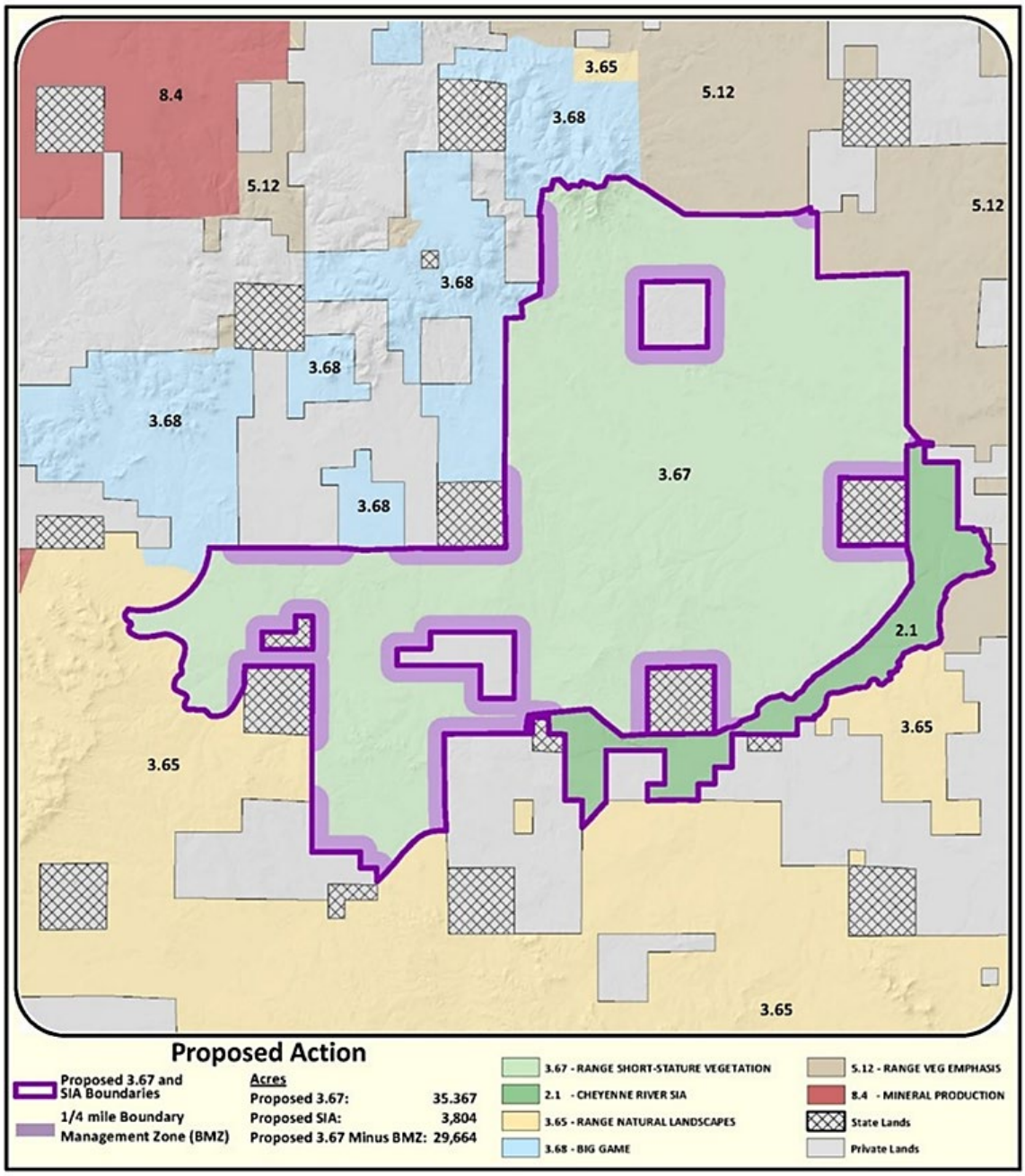

Figure D-2. Delineation of management area 3.67 and the Cheyenne River Special Interest Area for the proposed action alternative

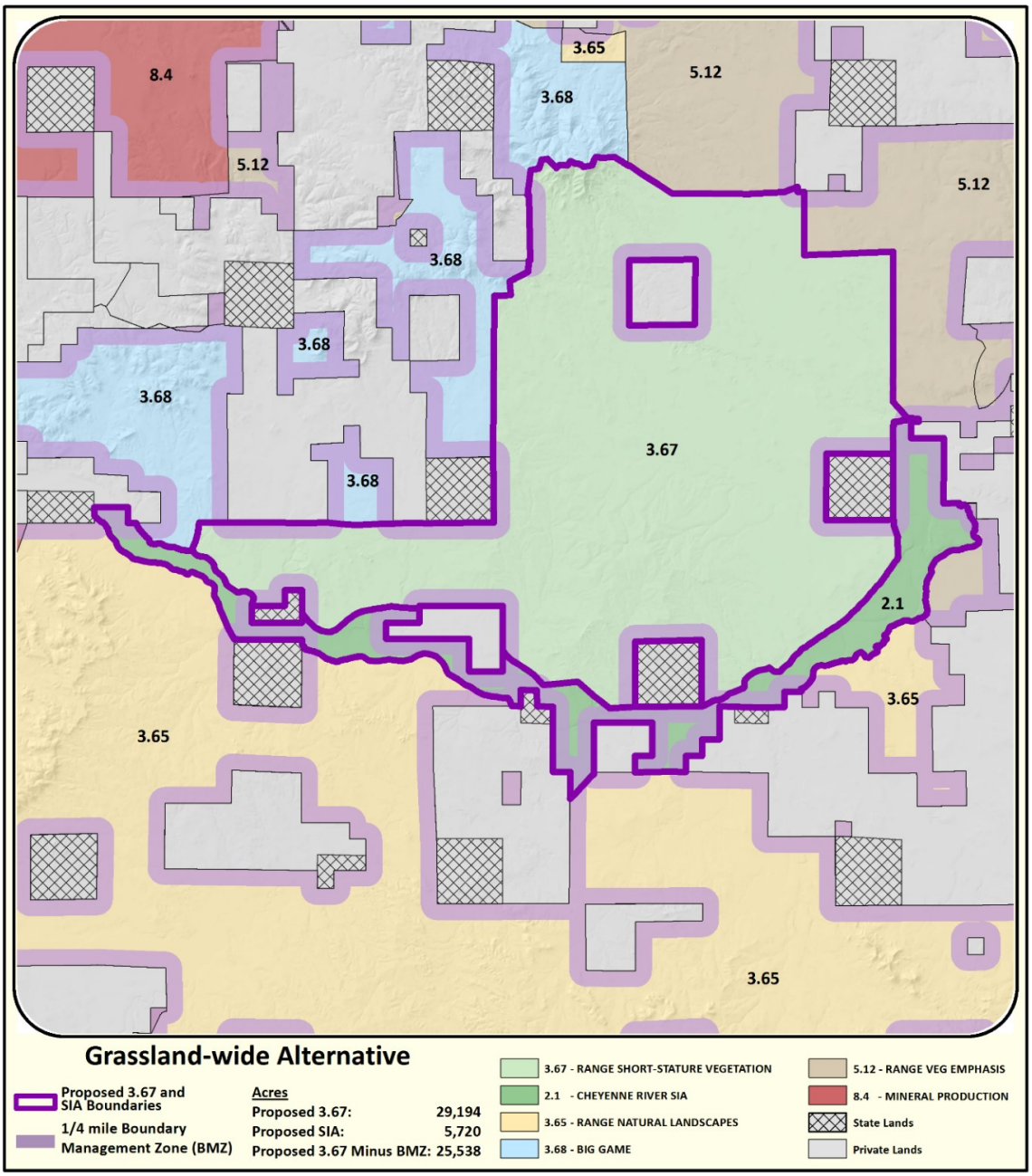

Figure D-3. Delineation of management area 3.67 and the Cheyenne River Special Interest Area for the grassland-wide alternative

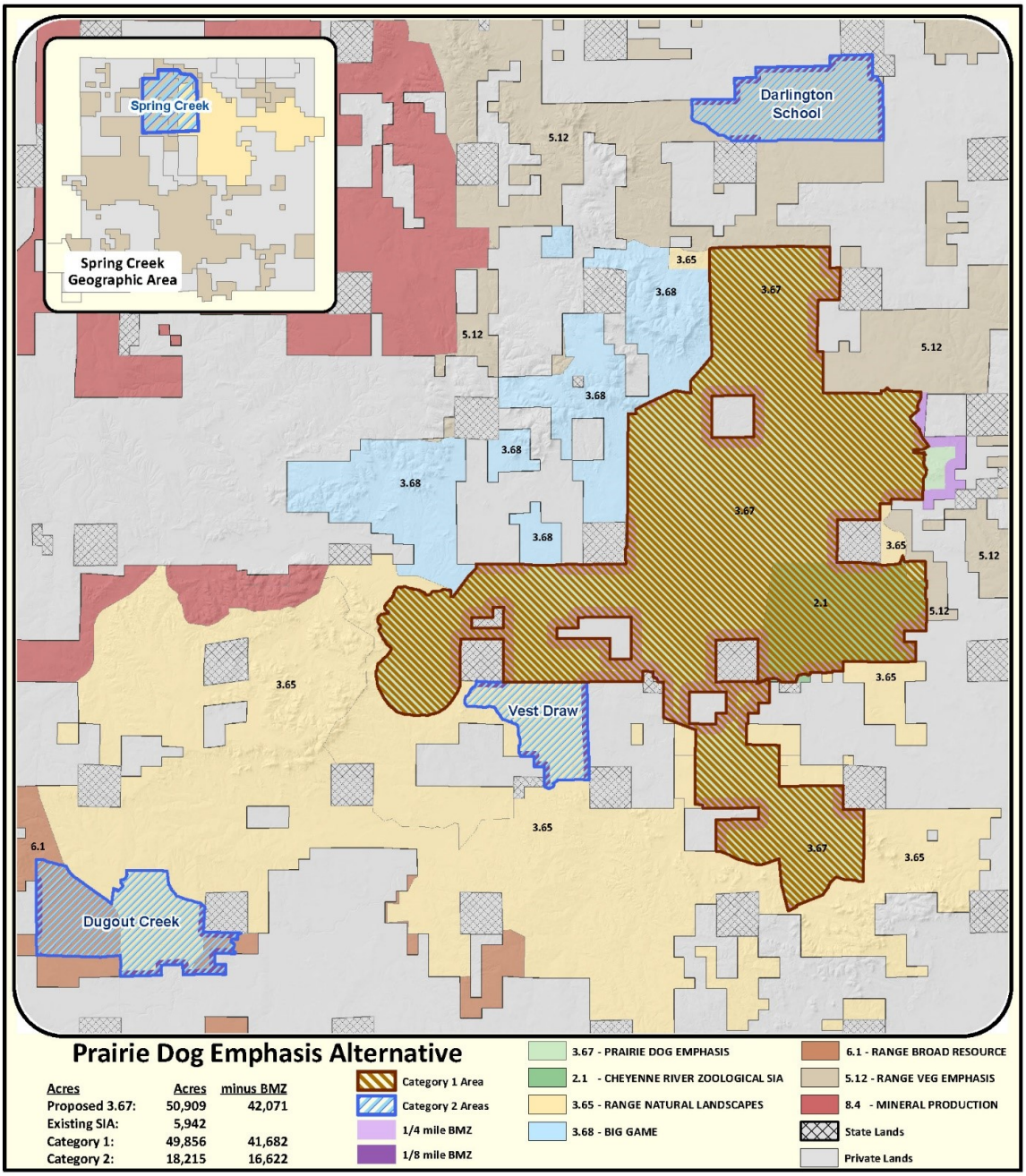

Figure D-4. Delineation of management area 3.67 and the Cheyenne River Special Interest Area for the prairie dog emphasis alternative

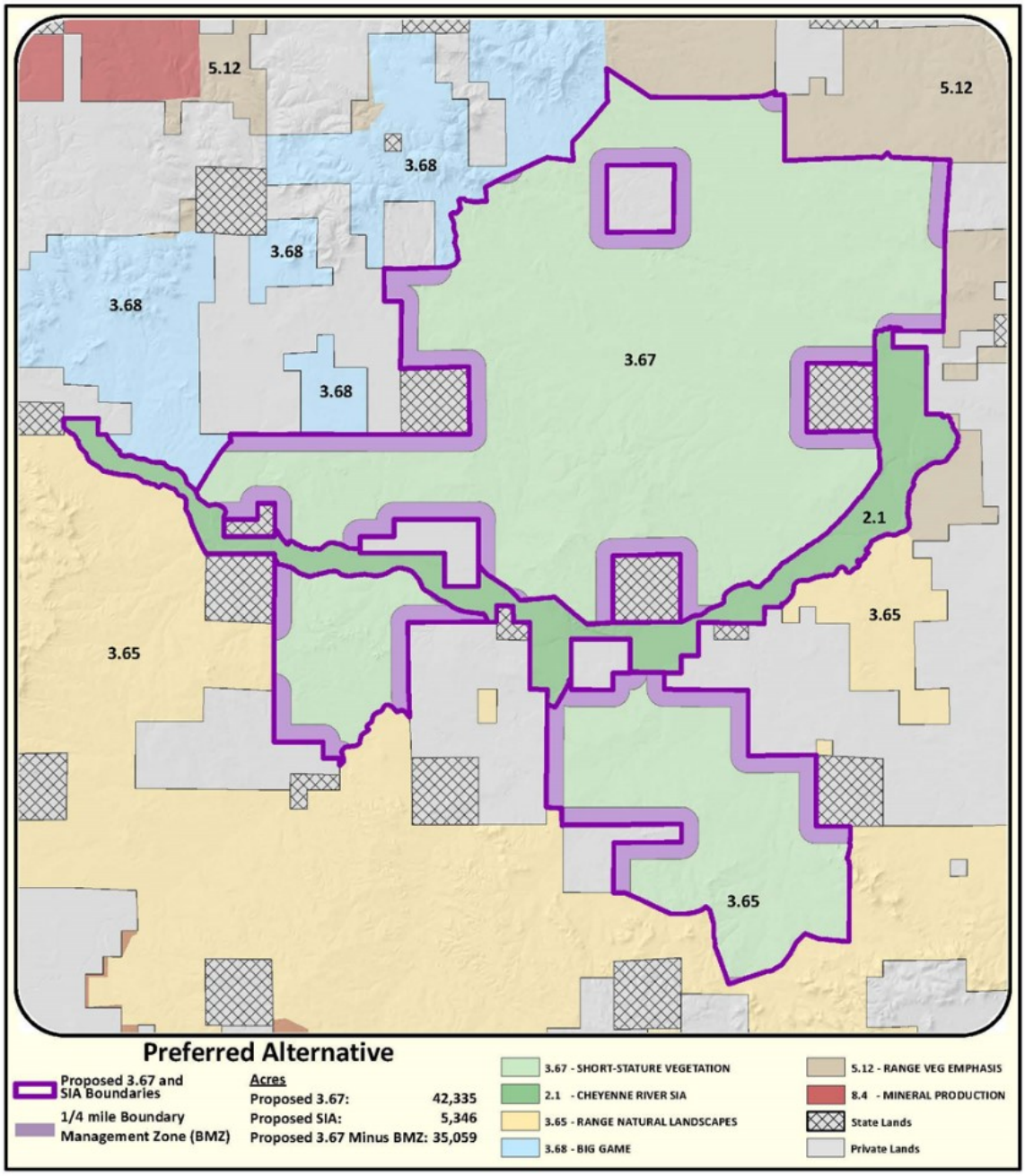

Figure D-5. Delineation of management area 3.67 and the Cheyenne River Special Interest Area for the preferred alternative

IV. Issues

Issues serve to highlight effects or unintended consequences that may occur from the proposed action or alternatives, giving opportunities during the analysis to reduce adverse effects and compare trade-offs for the decision maker and public to understand. The interdisciplinary team identified stakeholder concerns through the scoping process and wrote issue statements describing those significant issues that may be directly or indirectly caused by implementing the proposed action, may involve potentially significant effects, and could be meaningfully and reasonably evaluated and addressed within the scope of this

proposal. The interdisciplinary team then developed alternative management approaches (described in chapter 2) that could address issues while still meeting the purpose and need of the project (40 CFR 1500.2(e)).

Please note the following issue statements do not represent conclusions. They are public concerns that need to be addressed by alternatives and analyzed in the environmental impact statement.

1. Viability of Sensitive Species and Potential Species of Conservation Concern –
    a. Managed reductions in prairie dog colony size, distribution, or density could decrease the ability of prairie dogs and associated species to persist on the grassland.
    b. Extreme fluctuations in prairie dog colony extent due to drought, plague, and other environmental disturbances or stressors may occur despite management efforts and could decrease the ability of prairie dogs and associated species to persist on the Grassland.
    c. Effects of climate change on the grassland ecosystem could impact the ability of prairie dogs and associated species to persist on the grassland.
2. Black-footed Ferret Recovery –
    a. Managed reductions in prairie dog colony size, distribution, or density could reduce the availability of habitat for black-footed ferret reintroduction, the ability to reintroduce black-footed ferrets on the grassland, and the likelihood of achieving range-wide recovery criteria described in the US Fish and Wildlife Service 2013 Recovery Plan.
    b. Extreme fluctuations in prairie dog colony extent due to drought, plague, and other environmental disturbances or stressors may occur despite management efforts and could impact the availability of habitat for black-footed ferret reintroduction, the ability to reintroduce black-footed ferrets on the Grassland, and the likelihood of achieving range-wide recovery criteria described in the US Fish and Wildlife Service 2013 Recovery Plan.
    c. Social issues surrounding black-footed ferret recovery efforts could decrease the likelihood or success of future reintroduction.
3. Forage for Permitted Livestock –
    a. Management actions that increase or decrease prairie dog colony size, distribution, or density could change forage availability for livestock production on Federal land.
    b. Encroachment of prairie dogs onto private and state lands could impact forage availability for livestock production on private and state land.
4. Economic Concerns
    a. Changes to forage availability could impact income and jobs associated with ranching activities.
    b. Encroachment of prairie dogs onto private lands could decrease land values and impact facilities.
5. Health concerns –
    a. Existence of plague among wildlife populations on the Thunder Basin could pose a risk to human health.
6. Safety concerns – Prairie dog colonies and burrows could create safety hazards for permittees, workers, visitors, and livestock on Federal land and where encroachment has occurred on state and private lands.

7. Recreational Shooting –
    a. Prohibitions on shooting may eliminate a tool for controlling prairie dog populations.
    b. Prohibitions on shooting could reduce recreational opportunities and associated economic benefits for surrounding communities.
    c. Allowing shooting within MA 3.63/3.67 may disrupt prairie dog reproduction and dispersal dynamics and may cause direct take of associated and protected species.
8. Federal Land Boundary Management – A boundary management zone of ¼ mile may not be adequate to prevent encroachment onto private and state lands.
9. Use of Rodenticides –
    a. Rodenticides used to kill prairie dogs could poison and kill other, non-target wildlife species.
    b. Restrictions on rodenticide use could make control of prairie dogs ineffective.
10. Cost of Implementation of Plan Amendment – Costs associated with staff time, supplies, and other resources could limit the ability to implement the plan effectively.
11. Failure to Implement Current Management Plan – More aggressive implementation of the current plan could reduce conflicts and the need for a plan amendment.
12. Laws, regulations, and policies –
    a. Proposed changes to prairie dog management could conflict with requirements of the National Forest Management Act and 2012 Planning Rule, National Environmental Policy Act, and Endangered Species Act, particularly with regard to rangeland management and management of at-risk species.
    b. Forest Service may not be fulfilling its role regarding recovery of species listed under the Endangered Species Act.
    c. Forest Service may not have legal authority to manage national grasslands for multiple uses.
    d. Forest Service may not be appropriately addressing detrimental environmental impacts from prairie dog occupancy, including soil erosion.
13. Candidate Conservation Agreements – Candidate Conservation Agreements and Candidate Conservation Agreements with Assurances (CCAs, CCAAs) could reduce the acres of prairie dog colonies needed on Federal land to provide habitat for associated species across the landscape.
14. Greater sage-grouse Habitat – Occupancy of greater sage-grouse habitat management areas by both prairie dogs and greater sage-grouse could create management conflicts.
15. Collaborative Stakeholder Group – If the collaborative stakeholder group is poorly organized, unbalanced in membership, or cannot produce consensus decisions, then the group may be ineffective and recommendations may not be representative of diverse interests.

V. Affected Environment

The Thunder Basin National Grassland is located in northeastern Wyoming and encompasses approximately 553,000 acres in Campbell, Converse, Crook, Niobrara, and Weston counties. The TBNG is heavily interspersed with privately-owned and state-managed lands, together creating a grassland ecosystem approximately 1.8 million acres in extent. The TBNG spans an ecotone between mixed-grass prairie, shortgrass steppe, and sagebrush steppe with topography of flats plains, steep but low hills, and occasional badlands (Haufler et al. 2008). Within this ecotone, the vegetation communities consist

primarily of Wyoming big sagebrush (*Artemisia tridentata ssp. wyomingensis*) and a mixed-grass prairie of the wheatgrass-needlegrass association (USDA 2015). This transitional landscape represents the range limit for many plant species of both the Great Plains and the Intermountain Region and contains flora from the northern and southern Rocky Mountains. Some of these species are common in their principal areas of distribution but are peripheral and uncommon in Wyoming and on the ecotonal habitat of the TBNG.

Existing Information

A review was conducted prior to the analysis to assemble known information on rare plants in Management Area 3.63, proposed management area 3.67, and the current and proposed Cheyenne River Special Interest Area(s). Habitat requirements and known locations of Threatened, Endangered, Proposed, and R2 sensitive species (collectively 'TESP') and a preliminary list of potential Species of Conservation Concern (SCC) were reviewed to evaluate the probability of occurrence in the project area and likelihood of association with the presence or absence of prairie dogs and the resulting vegetation communities. Results of all available floristic surveys and inventories on the TBNG were used to help determine known occurrences of TESP and generate a list plant species that meet the minimum criteria for consideration as potential SCC in the project area. No field surveys were conducted specifically for this project, and all analysis is based on existing datasets.

Rare plant occurrence records were collected from:

- The USDA Forest Service records from the Threatened, Endangered, and Sensitive Plants and Invasive Species database,
- Observations provided by the Agriculture Research Service,
- Element occurrence records from Wyoming Natural Diversity Database (WYNDD),
- Collections housed in the Rocky Mountain Herbarium (RMH) at the University of Wyoming and the MacGregor Herbarium (KANU) at the University of Kansas,
- And data from the Southwest Environmental Information Network (SEINet), which uses a common web interface to link many regional data portals, including online herbaria.

Policy and Law for Rare Plants

This report analyzes potential effects of the project alternatives (as part of the National Environmental Policy Act process) on three categories of rare plant species identified under the Federal law and Forest Service policy. Cumulatively, there are 17 plant species these policies and laws identify, and potential direct, indirect and cumulative effects to these species are described in Sections VI, V, and IV.

Threatened, Endangered, and Proposed Species

The Endangered Species Act (16 U.S.C. §1531 et seq. (1973)) provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The law requires the Forest Service, in consultation with the U.S. Fish and Wildlife Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a "taking" of any listed species, including; remove and reduce to possession any plant from areas under Federal jurisdiction; maliciously damage or destroy an endangered plant on areas under Federal jurisdiction; and remove, cut, dig up, or damage or destroy any endangered plant in knowing violation of any state law or regulation or in the course of a violation of a state criminal

trespass law. These prohibitions apply to live or dead animals or plants, their progeny (seeds in the case of plants), and parts or products derived from them. ESA prohibitions may be found in section 4 (d), section 9 (a)(2), 50 CFR 17.61, and 50 CFR 17.71. For the Plan Amendment, Ute ladies' tresses (*Spiranthes diluvialis)* is the only federally listed plant in the project area.

Regional Forester Sensitive Species

USDA Forest Service policy for wildlife, fish, and sensitive plant habitat management (Forest Service Manual 2600, Chapter 70, Amendment 2670-2018-1), directs Regional Foresters to identify native plants and animals ("sensitive" species) that show evidence of decline and potential sensitivity to national forest and national grassland activities and management. These species are given special management attention in order to avoid contributing to their continued decline through management actions and prevent future listing under the national Endangered Species Act. Potential direct, indirect, and cumulative effects to sensitive species are analyzed for each management project in a Biological Evaluation. Conservation of Sensitive plant species was considered during the planning process for the Thunder Basin National Grassland Land and Resource Management Plan (2001) and Table 1 shows the Standards and Guidelines specifically designed for the protection of these species. No changes are proposed to these plan components and they will remain the same under all alternatives. This document includes an analysis of potential effects to the one sensitive species known from the project area, Barr's milkvetch (*Astragalus barrii*). In addition, several other species with suitable habitat within the vicinity of the TBNG have been considered and effects to suitable but unoccupied habitat have been analyzed, where appropriate.

Table D-2. Standards and Guidelines from the Thunder Basin National Grassland Land and Resource Management Plan (2001) Chapter 1. Biological Resources, Section F. Fish, Wildlife, and Rare Plants

Sensitive Plant and Animal Species	
Guideline #35	Do not authorize new facilities, roads, trails, fences, salting and mineral areas, water developments in habitat occupied by sensitive plant species
Standard #36	During the AMP process or as other opportunities arise, design and implement livestock grazing strategies that allow sensitive plant species to complete their reproductive cycles at a frequency that maintains and enhances populations of those species occurring in the local area.
Guideline #37	Identify sensitive plant habitats and rare plant communities as priorities for invasive plant monitoring and control.
Guideline #38	Avoid the use of invasive plant control methods that may negatively impact sensitive plants.
Standard #39	As opportunities arise, design timing, intensity, and frequency of mowing, burning, and livestock grazing to maintain and/or increase sensitive plant species populations and the health of rare plant communities.
Standard #40	Do not authorize vegetation management and construction projects that would prevent recolonization of sensitive plant populations from adjacent populations.
Standard #41	Do not develop any additional springs and seeps where associated habitat for sensitive plant species would be degraded or lost.

Potential Species of Conservation Concern

In 2012, the Forest Service adopted new planning regulations, referred to as the 2012 Planning Rule. The 2012 Planning Rule outlines specific requirements related to the protection of at-risk plant and animal species. The term at-risk species includes a new category of species, called Species of Conservation Concern (SCC) (36 CFR 219.9, FSH 1909.12_ 20, 23.13). This new category replaces the older sensitive species designation used by the Forest Service under prior planning rules. Like sensitive species, SCC are determined by the regional forester for each Forest Service region. The definition of an SCC, as written in the 2012 Planning Rule, is:

> "A species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area" (36 CFR 219.9(c)).

Critically, it must be noted that the plan amendment will not result in an official designation of species of conservation concern on the TBNG by the Rocky Mountain Region Regional Forester. Because the plan amendment will not fully revise the grassland plan, the existing grassland plan will still be guided by the older planning rule under which it was originally written. This means that the Regional Forester's Sensitive Species list will remain in place for the TBNG, and environmental analysis of the proposed plan amendment will analyze effects to sensitive species. At the same time, the 2012 Planning Rule requires the consideration of effects to *potential* SCC when crafting changes to plan components. If the environmental analysis reveals that the plan amendment will result in "substantial adverse impacts to a specific species, or the proposal would substantially lessen protections for a specific species" meaning viability will be lost, and that species has potential to meet the Regional Forester's minimum criteria for consideration as a potential SCC, the Responsible Official must treat those species as if they were SCC during the planning process (81 Federal Register 90726). In other words, the plan amendment must contain plan components to provide for the ecological conditions necessary to maintain a viable population of each species meeting the minimum criteria for consideration as a potential SCC and that are likely to be substantially affected by the plan amendment, as determined by the Responsible Official.

There are 16 plant species on the TBNG that meet the minimum criteria for consideration as potential Species of Conservation Concern. One species is the only sensitive species known from the TBNG, Barr's milkvetch (*Astragalus barrii),* and the other 15 are species that are not currently managed for on the TBNG. Species Conservation Assessments for all 16 species are in "Potential Species of Conservation Concern Species Evaluations for the Thunder Basin National Grassland" (USDA Forest Service 2019) and the effects of all five alternatives on these species are analyzed in the following sections (V and VI).

VI. Threatened, Endangered, and Proposed Plant Species and Designated Critical Habitat Considered in the Analysis

A species list was generated from the U.S. Fish and Wildlife Service's Information for Planning and Consultation website (IPaC, https://ecos.fws.gov/ipac/location/index) in July of 2019 in order to determine if there are any federally listed plants in the project area. This list was used to determine that one federally Threatened, Endangered or Proposed plant species has the potential to occur in the project area, Ute ladies'-tresses (*Spiranthes diluvialis),* and there are no designated critical habitats in this area (Table D-3).

A pre-field review was conducted of available information to assemble occurrence records, describe habitat needs and ecological requirements, and determine whether field reconnaissance is needed to complete the analysis. Sources of information included Region 2 Forest Service records and files, the Wyoming Natural Diversity Database, NatureServe, U.S. Fish and Wildlife Service information, and the best available science in the form of published peer-reviewed research (USFWS 1992, Sipes and Tepedino 1995, USFWS 1995, Fertig 2000, Pierson and Tepedino 2000, Szalanski et al. 2001, Fertig et al. 2005, Heidel 2007, Heidel and Fertig 2007). There are no known occurrences of Ute ladies'-tresses in the project area, though potential habitat exists.

No further analysis is needed for species that are not known or suspected to occur in the project area, and for which no suitable habitat is present. Table D-3 documents the rationale for excluding a species. If

suitable but unoccupied habitat is present, then additional survey is needed, or presence can be assumed, and potential effects evaluated.

Table D-3. Threatened, endangered and proposed species considered and evaluated

Species common and scientific name	Conservation status[1]	Potential to occur?	Rationale for exclusion[2]	Brief habitat and range description
Ute Ladies'-tresses *Spiranthes diluvialis*	T	YES	--	Occurs on seasonally flooded river terraces, sub-irrigated or spring-fed abandoned stream channels and valleys, and lakeshores. Moist meadows associated with perennial stream terraces, floodplains, and oxbows below 7,000 feet. Known from UT, CO, WY, NV, KS, MT, NE and one site in British Columbia (NatureServe 2019).

[1] **Status Codes**: **E**=federally listed endangered; **T**=federally listed threatened; **P**=federally proposed/candidate for listing

[2] **Exclusion Rationale Codes**: **HAB**= no habitat present in Analysis Area; **ELEV**= outside elevational range of species; **RANGE**= outside distributional range of species; **ODR**= outside known distributional range of species

Effects Analysis for Federally Listed Species

Existing Condition

S. diluvialis is known from northern and south-central Utah, central to north-central and northwestern Colorado, east-central and southeastern Wyoming, eastern Idaho, southwestern Montana, eastern Nevada, western Nebraska, and central to north-central Washington, as well as British Columbia, where recently discovered (NatureServe 2019). It occurs in at least 33 counties in the United States as well as at one site in British Columbia. Utah has the largest number of extant Element Occurrences (EOs) and the highest number of reported plants, followed by Colorado. There are two Wyoming known populations near the vicinity of the Thunder Basin National Grassland. Both occurrences are west of the proclamation boundary and near each other. One population is on Antelope Creek and the other is on the north fork of Wind Creek, about 40 miles west of the project area. Between the known Antelope Creek population and portions of Antelope Creek in the project area, are large open pit coal mine operations. Earth moving and ground water pumping activities associated with the mines have likely altered hydrogeomorphic conditions in downstream portions of Antelope creek, potentially making it unsuitable for *S. diluvialis* due to de-watering and/or increased salinity.

S. diluvialis is adapted to early- to mid-seral, moist to wet conditions, where competition for light, space, water, and other resources is normally kept low by periodic or recent disturbance events. Major occupied habitat types include:

1. alluvial banks, point bars, floodplains, or oxbows associated with perennial streams, with a high water table and short, perennial graminoid- and forb-dominated vegetation maintained by grazing, periodic flooding, or mowing;
2. river floodplain habitats which experience regular spring flooding and/or frequent large-scale floods but maintain relatively stable, moist to wet soil in summer, within moist meadow, riparian woodland, or riparian shrubland communities;
3. shores of lakes and reservoirs, in mesic meadow-type vegetation maintained by lake level fluctuations or seasonal flooding of gravel bars;

4. groundwater-fed springs, sometimes in desert settings, or sub-irrigated meadows where edaphic characteristics (e.g. high water table and calcic soil), fire, and/or grazing are sufficient to prevent invasion of later seral vegetation; and
5. human-influenced habitats, including perennial stream, river, lakeshore, and spring sites directly associated with human-developed dams, levees, reservoirs, irrigation ditches, reclaimed gravel quarries, roadside barrow pits, and irrigated meadows.

More than half of documented populations occur in sites in which natural hydrology has been influenced by dams, reservoirs, or supplemental irrigation, and many populations occur within agricultural or urban settings at 550 to 2,100 meters in elevation (Fertig et al. 2005, NatureServe 2019), but elevational limits may be lower at higher latitudes Wyoming (Heidel, pers comm 2014).

Extensive and multi-year surveys have been conducted throughout suitable habitat in much of the analysis area for *S. diluvialis.* These surveys have included the riparian corridor of the Cheyenne River in the Cheyenne River SIA, sections of Antelope Creek that are on Federal and state parcels, and other tributaries and drainages into these larger water bodies. Surveys were all conducted during the blooming window for this species, which typically occurs in August. To date, no *S. diluvialis* individuals or populations have been discovered in the analysis area or within the proclamation boundary of the Thunder Basin National Grassland. During plant survey efforts, wetland and riparian habitats were also informally assessed to better determine the suitability of these areas to support *S. diluvialis.* Many of these areas were observed to have salt crusts, short seasonal saturation periods, and/or to occur on soil types not known to support this species. These habitat observations, in conjunction with thorough surveys have led to the assumption that *S. diluvialis* does not occur within the project area. Surveys that included Forest System parcels are listed below:

Location	Year	Observers	Findings
Antelope Creek	1994	Wyoming Natural Diversity Database	negative
	1998	Forest Service	negative
	2004	Forest Service	negative
	2005	Wyoming Natural Diversity Database	negative
	2006	Forest Service	negative
	2007	Third Party	negative
Cheyenne River	1998	Forest Service	negative
	2004	Forest Service	negative
	2006	Forest Service	negative
	2007	Third Party	negative
	2011	Forest Service	negative
	2012	Forest Service	negative
Coal Bank Creek	1998	Forest Service	negative

Effects of Alternatives on Federally Listed Species

Since *S. diluvialis* does not occur in the project area, no effects to this species are expected as a result of any of the proposed alternatives. In addition, wetland and riparian habitats (such as those that could support *S. diluvialis*) are unlikely to be affected by the expansion or contraction of prairie dog colonies or changes to the management of prairie dogs. Management of riparian areas associated with the Cheyenne

River Special Interest Area are not expected to change as a result of any of the alternatives, even if the delineated boundaries of the special interest area are altered.

Consultation to Date

No consultation with U.S. Fish and Wildlife Service for *Spiranthes diluvialis* was initiated for this proposed action.

VII. Sensitive Plant Species Considered in the Analysis

The following list includes sensitive species, or their habitats that may occur in the 2020 Plan Amendment analysis area of the Thunder Basin National Grassland or are located adjacent to or downstream of the project and could potentially be affected. A pre-field review was conducted of available information on these species to assemble occurrence records, describe habitat needs and ecological requirements, and determine whether field reconnaissance was needed to complete the analysis. Sources for information include Region 2 Forest Service records and files, the Wyoming Natural Diversity Database, NatureServe, U.S. Fish and Wildlife Service information, and the best available science in the form of published peer-reviewed research (see bibliography for sources).

The 2018 Region 2 Regional Forester Sensitive Species List consists of 87 species, of which 1, Barr's milkvetch (*Astragalus barrii)*, is known to occur on the Thunder Basin National Grassland. Based on the pre-field review, there is one additional species, common twinpod (*Physaria didymocarpa var. latana)* with suitable habitat in the analysis area.

No further analysis is needed for species that are not known or suspected to occur in the project area, and for which no suitable habitat is present. Table D-4 documents the rationale for excluding a species. Species with known occurrences or suitable but unoccupied habitat in the project area have been carried forward in this analysis.

Table D-4. Region 2 Regional Forester Sensitive Plant Species considered and evaluated

Species	Conservation status[1] (WY)	Potential to occur?	Rationale for exclusion[2]	Brief habitat and range description	Biological determination[3]
Astragalus barrii	G3G4 S3	YES	--	Occurs on dry badlands and semi-barren slopes with low vegetation cover, on soils derived from shale, sandstone, silts and limestone. Rocky prairie breaks, ridges, knolls, road cuts, bluffs and slopes. 3,700 to 5,700 ft.	**PA** – no effect **GW** – no effect **PDE** – no effect **NA** – no effect
Common twinpod *Physaria didymocarpa* var. *latana*	G5T2S2	YES	--	Occurs in the Powder River Basin on sandstone outcrops, redbed clay (clinker or scoria)-shale slopes, calcareous substrates, and road cuts, open, shrub-dominated slopes, sometimes sparse cover of ponderosa pine and Rocky Mountain juniper. 3,300 to 9,000 ft.	**PA** – no effect **GW** – no effect **PDE** – no effect **NA** – no effect

Species	Conservation status[1] (WY)	Potential to occur?	Rationale for exclusion[2]	Brief habitat and range description	Biological determination[3]
Dakota buckwheat *Eriogonum visheri*	G3 NR	No	ODR	Badland islands in grassland matrix; Great Plains regional endemic currently only known from MT, SD, and ND. 1,900 to 3,000 ft.	--

[1] **Status Codes** (NatureServe 2019): **G1**=Critically Imperiled—At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors, **G** =Imperiled—At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors, **G3**=Vulnerable—At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors, **G4**=Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors, **G5**=Secure—Common; widespread and abundant. **S1**=critically imperiled in the state; **S2**=imperiled in the state; **S3**=vulnerable in the state; **SNR**=not ranked/under review; **SH**=possibly extirpated

[2] **Exclusion Rationale Codes**: **HAB**= no habitat present in Analysis Area; **ELEV**= outside elevational range of species; **RANGE**= outside distributional range of species; **ODR**= outside known distributional range of species

[3]**Biological Determination Codes**: **PA**= Preferred Alternative; **GWA**=Grassland-wide Alternative; **PDE**=Prairie Dog Emphasis Alternative; **NA**=No-Action Alternative

Effects Analysis for Sensitive Species

Existing Conditions

Astragalus barrii

A regional endemic, there are only approximately 110 total occurrences of this species world-wide. This species has an extremely limited range and is restricted to the Powder River Basin in Wyoming and Montana, and limited badlands in South Dakota and Nebraska. Roughly half (54) of the total known occurrences are in Wyoming, 23 of which are within the administrative boundaries of the Thunder Basin National Grassland. *A. barrii* occurs across the plan area including lands that may be affected by the proposed plan amendment and in other areas of prairie dog occupancy.

Astragalus barrii grows on dry badlands and semi-barren slopes with low vegetation cover. It is found on soils derived from shale, sandstone, silts and limestone. It typically occurs on rocky prairie breaks, ridges, knolls, and slopes. It is also found on sandstone bluffs, road cuts, and cow trails in Wyoming (Heidel 2004, Ladyman 2006). The habitat is usually described as badland or badland-like, such as broken or dissected hills. Vegetation in this environment tends to be sparse and adapted to limited nutrient availability and sediment movement (Brown 1971). This species usually occupies thinly vegetated patches between extensive expanses of other vegetation communities such as on calcareous soil outcrops in the vast Wyoming big sagebrush and grass dominated shrub-steppe. *A. barrii* was evaluated as a species meeting the minimum criteria for consideration as a potential Species of Conservation Concern (SCC) as part of the 2020 Plan Amendment process. Detailed information on the life history, ecology, and distribution of this species can be found in "Potential Species of Conservation Concern Species Evaluations for the Thunder Basin National Grassland" (USDA Forest Service 2019) posted to the project website.

Physaria didymocarpa var. *latana*

P. didymocarpa is also a regional endemic with a highly restricted range. It is found in north-central Wyoming (principally the Bighorn Mountains and parts of the Powder River Basin) and adjacent Montana in an area less than 100 square miles. There are 18 occurrences in Wyoming (Heidel and Handley 2004, Handley and Heidel 2011) and 10 occurrences in Montana (Natureserve 2019). Most occurrences are concentrated on the eastern flanks of the Bighorn Mountains, with a few on the western flanks and scattered plains populations, mainly to the north in Montana (Handley and Heidel 2011). There are no

known occurrences within the administrative boundary of the Thunder Basin National Grassland, but there is one outlying, eastern plains population near the TBNG. It is a small population 8 miles north of the TBNG proclamation boundary, north of Wright, Wyoming, in Campbell County near state highway 59.

P. didymocarpa is a small perennial herb found on shallow, stony soils of exposed limestone, sandstone or shale outcrops; and is typically found on ridges, rims, buttes, and knolls. Soils of occupied sites are primarily calcareous and associated with sedimentary bedrock formations. Some Montana populations are found on clinker scoria. Closely associated vegetation is very sparse, often with less than 10% cover, typically dominated by bunchgrasses, sometimes with a major cushion plant component. Surrounding vegetation can be denser and includes open forest or woodlands, shrublands and/or prairie grasslands. Though there is habitat on the TBNG that seems to match the ecological requirements for this species, *P. didymocarpa* var. *latana* was not found on the National Grassland during two different inventories conducted in 1979 and 2005 (Handley and Heidel 2011).

Effects of Alternatives on Sensitive Species

Astragalus barrii

Since *A. barrii* occurs patchily throughout management area 3.63 (and proposed management area 3.67) and other black-tailed prairie dog occupancy areas on the TBNG, impacts to *A. barrii* occurrences as a result of the alternatives must be considered. Possible impacts could result from prairie dog herbivory, clipping and/or disturbance as prairie dog colonies expand and/or are managed at different levels according to the alternative that is selected. Prairie dogs are known to forage on perennial forbs, though these types of plants make up a relatively small portion of their diet (Uresk 1984, Whicker and Detling 1988). However, at current levels grazing and trampling by native wildlife or livestock does not appear to substantially threaten any of the known populations of Barr's milkvetch. Little evidence of grazing by any herbivores has been observed on this species, except for light grazing by horses on one Montana population (). This could be due exclusively to the dense matt-like growth habit but may also be a result of noxious substances in the tissues, such as selenium or aliphatic nitro-compounds that deter grazers. No studies have been done on the chemical content of Barr's milkvetch plants, but these compounds are found in closely related species (Ladyman 2006). In addition, researchers in Badlands National Park have reported that natural expansion of prairie dog towns did not substantially impact the persistence of established Barr's milkvetch populations. They concluded that this is because the two species occupy different areas with different soil types and topographic positions (Dingman 2005, Ladyman 2006). The deep, loamy substrates and gentle slopes that are attractive to prairie dogs generally are not occupied by Barr's milkvetch, which is found on calcareous soil outcrops, badlands, semi-barren slopes, rocky ridges, road cuts and knolls. There have been no focused studies on the Thunder Basin, but observational evidence from the plan area supports these findings. No prairie dogs or burrows have been found co-occurring with Barr's milkvetch populations. It appears that though these two species share part of their distributional range, specific and differing habitat selection criteria creates mutually exclusive discontinuous distributions of both species and minimizes species overlap or interaction.

Since *A. barrii* populations and habitats are not thought to be affected by prairie dog herbivory or the expansion or contraction of prairie dog colonies, none of the management alternatives are expected to have any direct, indirect or cumulative impacts on this species. Therefore, the biological determinations under the Proposed Action, the Grassland-wide Alternative, the No Action Alternative, and the Prairie Dog Emphasis Alternative are all ***no effect.*** Additional background information contributing to the rationale for the biological determination for this species are given in the Species of Conservation Concern Assessment for *Astragalus barrii* in the "Potential Species of Conservation Concern Species

Evaluations for the Thunder Basin National Grassland" (USDA Forest Service 2019). In addition, though initial evaluation found that the plan amendment has the potential to cause substantial adverse impacts to or substantially lessened protections for this species, further analysis has aided the Responsible Official in determining that impacts are unlikely and/or will be negligible and cannot be considered "substantial".

Physaria didymocarpa var. *latana*

Since *P. didymocarpa* is not known to occur in Management Area 3.63, the Cheyenne River SIA or the proposed versions of Management Area 3.67, potential effects to suitable but unoccupied habitat will be evaluated. This species is known from shallow, rocky, calcareous soils on slopes, knolls, rock outcrops and exposed areas. While these habitats do exist on the Thunder Basin and in the areas included in the 2020 Plan Amendment, prairie dog seldom occupy shallow, rocky soils on the TBNG due to the difficulty of building burrows (Haufler et al. 2008). Soils preferred by prairie dogs, such as deep loams and clayey loams, are not suitable habitat for *P. didymocarpa*. Prairie dogs are also not likely to browse the vegetation on rock outcrops, knolls, and other elevated and steep areas due to the risk of predation in those exposed sites, far from burrows. The available information indicates that although *P. didymocarpa* has potential habitat in the plan area, those areas are unlikely to be affected by the expansion or contraction of prairie dog colonies or changes to the management of prairie dogs.

It is our conclusion that suitable but unoccupied habitat for this species of is unlikely to be directly or indirectly affected by management changes following any selected alternative. Therefore, the biological determinations under the Proposed Action, the Grassland-wide Alternative, the No Action Alternative, and the Prairie Dog Emphasis Alternative are all ***no effect*** for *Physaria didymocarpa* var. *latana* and suitable habitat.

Responsibility for a Revised Biological Evaluation

This biological evaluation was prepared based on presently available information. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact endangered, threatened, proposed, or sensitive species that in a manner or to an extent not previously considered, a new or revised biological evaluation will be required.

VIII. Report on the Preliminary List of Potential Plant Species of Conservation Concern

A preliminary list of potential Species of Conservation Concern (SCC) for the Thunder Basin National Grassland was generated using the criteria in the 2012 Planning Rule (36 CFR 219.9, FSH 1909.12_ 20, 23.13) (described in greater detail in Section V of this document). A total of 16 plant species met the initial minimum criteria of potential SCC in the plan area. During the evaluation process 1 species was disqualified because upon detailed examination it was found to not actually meet the established minimum criteria of a potential SCC under FSH 1909.12.52(d). Short woollyheads (*Psilocarphus brevissimus)* could not be shown to be established on the unit, the last known record from 1973 is in an area that has been extremely modified from strip mining, and thus, this species is thought to be extirpated. Species must be established or becoming established in the plan area in order to meet minimum potential SCC criteria. *P. brevissimus* has a species evaluation in which the species records, SCC criteria, and species status in the plan area are examined in greater detail. This evaluation is available in the "Potential Species of Conservation Concern Species Evaluations for the Thunder Basin National Grassland" (USDA Forest Service 2019) posted to the project website.

The remaining 15 species on the preliminary list of potential SCC plant species are in Table D-5 and the potential effects of the 2020 Plan Amendment alternatives are evaluated in the remainder of this section. The initial species evaluations found that 6 of the plant species had local distributions that overlap with prairie dog occupancy areas and a subset of those also had shared habitat requirements (Table D-5). It was determined that due to these factors, there is potential for the plan amendment to cause substantial adverse impacts to or substantially lessened protections for these species. This document further analyzes the potential for impacts to these species as a result of the plan amendment and uses best available science to aid the Responsible Official in determining if adverse impacts or lessened protections are expected to be "substantial" in that outcomes could negatively affect the species' capability to persist over the long-term in the plan area.

Complete species evaluations for each plant are available in the "Potential Species of Conservation Concern Species Evaluations for the Thunder Basin National Grassland" (USDA Forest Service 2019) posted to the project website.

Table D-5. Preliminary list of Potential Species of Conservation Concern considered and evaluated. All species are established in the plan area, the third column indicates if the species is known from the project area (MA 3.63, proposed MA 3.67, and the Cheyenne River SIA) and the fourth column determines if best available science indicates if the proposed plan amendment and any alternatives have the potential to cause substantial adverse impacts to or substantially lessened protections for each species.

Species common and scientific name	Conservation status[1] (WY)	Found in the project area	Potential for substantial adverse impacts or substantially lessened protections
Prairie threeawn *Aristida oligantha*	G5 S1	No	No
Barr's milkvetch *Astragalus barrii*	G3G4 S3	Yes	**YES**
Cream milkvetch *Astragalus racemosus* var. *racemosus*	G5T5 S2	No	No
Sartwell's sedge *Carex sartwellii*	G5 S2	No	No

Species common and scientific name	Conservation status[1] (WY)	Found in the project area	Potential for substantial adverse impacts or substantially lessened protections
Smooth goosefoot *Chenopodium subglabrum*	G3G4 S3	**Yes**	**YES**
Watson's goosefoot *Chenopodium watsonii*	G5 S1	**Yes**	**YES**
Texas toadflax *Nuttallanthus texanus*	G4G5 S2	**Yes**	**YES**
Rosy Palafox *Palafoxia rosea var. macrolepis*	G5T4 S1	**Yes**	**YES**
Narrowleaf pectis *Pectis angustifolia var. angustifolia*	G4G5TNR S1	**Yes**	No
Sunbright *Phemeranthus parviflorus*	G5 S2	**Yes**	**YES**
Whorled milkwort *Polygala verticillata*	G5 S1	No	No
Viscid tansyaster *Rayjacksonia annua*	G4G5 S2	No	No
Verrucose seapurslane *Sesuvium verrucosum*	G5 S1?	No	No
Narrowleaf blue-eyed grass *Sisyrinchium angustifolium*	G5 S2	No	No
Composite dropseed *Sporobolus compositus var. compositus*	G5T5 S2	No	No

[1] **Status Codes** (NatureServe 2019): **G1**=Critically Imperiled—At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors, **G** =Imperiled—At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors, **G3**=Vulnerable—At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors, **G4**=Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors, **G5**=Secure—Common; widespread and abundant. **S1**=critically imperiled in the state; **S2**=imperiled in the state; **S3**=vulnerable in the state; **SNR**=not ranked/under review; **SH**=possibly extirpated

Effects Analysis for the Preliminary List of Potential Species of Conservation Concern

Existing Conditions

The existing condition of each species on the preliminary list of potential SCC is described in the Species of Conservation Concern evaluations in the "Potential Species of Conservation Concern Species Evaluations for the Thunder Basin National Grassland" (USDA Forest Service 2019) posted to the project website. These documents are a compilation of the best available science on each species, using publicly available sources as well as data from the Forest Service and partner agencies. The evaluations describe the distributional range of each species and how TBNG populations fit into the broader range. They describe each species physically and give life history details. They give habitat structure, function, composition, and connectivity information, range-wide and in the plan area, as well as current and future habitat trends, if known. Population trends and threats are also described, including drivers, stressors and ecological conditions that may be limiting factors to persistence. The trend data has been tied to management objectives, activities, and trends on the unit when possible. Finally, each evaluation notes if each species is in some way expected to be associated with short-statured vegetation, bare ground, the

presence or absence of live prairie dogs, or some other habitat characteristic that results in or is exclusive to prairie dog colonies (mixed grass prairie eco-tone, short-grass steppe, disturbed ground, etc.). The relationship is described as explicitly as possible, noting if occurrence in prairie dog habitat or towns seems incidental or if relationship between species may be significant. If a relationship is suspected, further discussion on potential effects to each species as a result of changes to prairie dog management is given. The content of the evaluations follows the guidance in FSH 1909.12 Chapter 10, Section 12.5 – Identifying and Assessing At-risk Species.

Effects of Alternatives on the Preliminary list of Potential Species of Conservation Concern

The following section analyzes the effects of the plan amendment on the potential plant species of conservation concern in greater detail. The focus of this analysis is to determine if adverse impacts or lessened protections for each species rise to the level of "substantial" (81 Federal Register 90726). A substantial adverse impact would be an impact that causes the viability of the species on the Thunder Basin National Grassland to be lost. Similarly, a substantially lessened protection would result if the plan amendment removes or lessens a protection necessary to maintain a viable population of that species on the Thunder Basin National Grassland. Isolated impacts or mortality among individuals of a species are not considered substantial unless viability across the plan area is affected. The only plant species that have been carried forward in this analysis are those 6 which were found during the species evaluation process to have the *potential* to be substantially adversely impacted or to have substantially lessened protections as a result of the plan amendment. All other plant species have been excluded from further analysis because best available science has been used to show that the plan amendment does not have the potential to cause substantial adverse impacts to or substantially lessened protections for these species. One preliminary potential SCC, Barr's milkvetch (*Astragalus barrii)* is also a sensitive species and effects of the alternatives of the 2020 Plan Amendment are analyzed in Section VII: Regional Forester Sensitive Species Considered in the Analysis. Section VII also determines if impacts to *A. barrii* are expected to be substantial – they are not. Information below is provided in summary format, for more detailed information, in-text citations, and a list of scientific references, please see the "Potential Species of Conservation Concern Species Evaluations for the Thunder Basin National Grassland" (USDA Forest Service 2019) posted to the project website.

Chenopodium subglabrum

C. subglabrum is a psammophyte (sand lover), and in the plan area has been found on the sandy, actively moving soils on the stream terraces of Antelope Creek. The sandy soils preferred by this species are also characterized as having high percentages of bare ground. However, this type of bare ground is maintained by eolian processes and is not the same as the bare ground of prairie dog colonies. Prairie dog seldom occupy sandy ecological sites on the TBNG due to the difficulty of building burrows in sandy soils. Prairie dogs also do not typically occupy stream bottoms and alluvial terraces and do not share habitat requirements with *C. subglabrum* in the plan area. There is also no evidence of prairie dog herbivory on this species and it is unlikely that prairie dog activities or expansion/contraction of colonies would impact *C. subglabrum* and its habitat. In addition, the management of riparian corridors and stream channels, such as along Antelope Creek, is not expected to change under the plan amendment. Consequently, the Responsible Official has determined that the plan amendment will not cause substantial adverse impacts to or substantially lessened protections for *C. subglabrum* because viability of the species is not expected to be adversely impacted.

Chenopodium watsonii

C. watsonii is an early seral, bare ground colonizer and has the potential to depend on the disturbance caused by prairie dogs to proliferate and successfully reproduce. However, the single *C. watsonii* occurrence on Forest System Lands in the plan area is not on a prairie dog town, but all other occurrences from the vicinity (lands of other ownership) appear from aerial reconnaissance to occur on prairie dog colonies. The potential relationship between *C. watsonii* suitable habitat and prairie dog activities is unknown. No documentation was found that indicated an affiliation between the species, but there is some overlap of species occupancy on private and state-owned lands and some known shared habitat characteristics (i.e. disturbed areas). In addition to being an early seral species of disturbed sites, *C. watsonii* is also an annual plant species, many of which are known to increase as a result of prairie dog activities. Decreasing the acreage managed for prairie dog colonies as part of the proposed action has the potential to lessen protections for this species by decreasing the amount of suitable habitat available in the plan area. However, this conclusion is speculative. At this time, there is no scientific information available confirming a relationship between these two species and they are not known to share habitat on Forest System Lands in the plan area. As per FSH 1909.12_10, 12.52c, if there is insufficient scientific information available to conclude there is a substantial concern about a species' capability to persist in the plan area over the long-term that species cannot be identified as a species of conservation concern. Available information is insufficient for the Responsible Official to determine if adverse impacts or lessen protections from the plan amendment could be substantial and at this time there are no suggested management actions to provide for the persistence of the species.

Nuttallanthus texanus

Since *N. texanus* is an early seral, annual forb it has the potential to be associated with prairie dog colonies. Species of *Nuttallanthus* have shown a preference for early successional communities, disturbed soils, and recent burns throughout their range. Twenty percent of the rangeland vegetation on the TBNG is in an early seral stage, which is often associated with post-disturbance pioneer plant communities and typically contains higher percentages of bare soil and annual forbs and grasses. Moreover, 10 of 12 *N. texanus* plan area occurrences are located on loamy or saline upland ecological sites, which are both considered highly suitable habitat for prairie dog colonies. However, only one occurrence is found within prairie dog occupancy areas and there is no evidence in the literature that prairie dog activity benefits or creates habitat for *N. texanus*. Due to the lack of occurrences on prairie dog colonies in the plan area, it is unlikely that *N. texanus* depends on prairie dog disturbance for the creation or maintenance of suitable habitat. The co-occurrence of these two species on the TBNG would therefore likely be considered incidental. In addition, only 1 of 12 plan area occurrences is found in lands affected by the plan amendment, which constitutes a relatively small percentage of total known individuals that could even potentially be impacted. Consequently, the Responsible Official has determined that the plan amendment will not cause substantial adverse impacts to or substantially lessened protections for *N. texanus* because viability of the species is not expected to be adversely impacted.

Palafoxia rosea

P. rosea is an annual forb that prefers sunny locations and sandy or clayey, shallow soils. It is found in the south east section of the plan area on gentle, rolling topography and has the potential to be associated with prairie dog colonies. However, prairie dogs seldom occupy sandy ecological sites on the TBNG due to the difficulty of building burrows in coarse-textured soils. Prairie dogs also do not prefer areas with shallow soils, such as the shallow clayey and shallow loamy sites that, with sandy sites, support most of the *P. rosea* occurrences on the TBNG. A comparison of known *P. rosea* locations with mapped preferred and marginal prairie dog habitat shows very little overlap in species occupancy. Only two of the eight extant *P. rosea* occurrences in the proclamation boundary of the TBNG are in areas mapped as marginal prairie

dog habitat, none occur in preferred habitat. Some of the other occurrences are in the vicinity of prairie dog colonies, while the remainder are farther away, a separation in species habitat selection likely driven by soil type preferences. The largest of the populations on the TBNG is adjacent to a National Forest System road and seems to proliferate along the disturbance corridor created by the road. Based on life history and habitat information, it is likely the two known *P. rosea* occurrences that are present in marginal prairie dog habitat are incidental and not indicative of a relationship between species or larger pattern of shared habitat requirements. We conclude that shifts in vegetation as a result of changing management of prairie dogs have the potential to affect a small number of individuals that currently occupy marginal prairie dog habitat. However, the nature of these effects seems limited to shifting the distribution of this species away from prairie dog disturbances, and towards anthropogenic disturbances and other natural disturbances in the plan area. Consequently, the Responsible Official has determined that the plan amendment will not cause substantial adverse impacts to or substantially lessened protections for *P. rosea* because viability of the species is not expected to be adversely impacted.

Phemeranthus parviflorus

P. parviflorus is a perennial herbaceous plant that is most often found on slopes, grassland barrens topped with desert pavement, and sparse sagebrush shrublands. The majority of *P. parviflorus* occurrences in the plan area are in the southeast corner of the plan area and mapped as shallow clayey ecological sites. These ecosystems and soil types are generally not considered to be preferred by prairie dogs for burrowing due to the shallowness of soils. Maps of preferred and marginal prairie dog habitat in the plan area support this assertion, and occurrences of *P. parviflorus* and prairie dogs only overlap in a few small areas mapped as marginal. The majority of P. parviflorus occurrences are south of the amendment area in the sagebrush steppe where soils and topography make the area unsuitable for prairie dogs. There is also no evidence in the literature or on the ground that the disturbance caused by prairie dog activity benefits *P. parviflorus* or creates suitable habitat in any way; this species is not documented as a colonizer of disturbed sites. For these reasons, it is highly unlikely that *P. parviflorus* shares habitat requirements with prairie dogs or depends on prairie dog activities for the creation or maintenance of suitable habitat. In theory, a decrease in the extent of prairie dog could generate more suitable, sagebrush steppe habitat for this species, yet this merely speculative and not supported by any data or literature. It is also unclear how vegetation in the plan area may shift over time under each alternative, with ongoing land uses such as grazing from livestock and native ungulates. Consequently, the Responsible Official has determined that the plan amendment will not cause substantial adverse impacts to or substantially lessened protections for *P. parviflorus* because viability of the species is not expected to be adversely impacted.

Summary of Findings

The proposed 2020 Thunder Basin Plan Amendment, including all alternatives, is not expected to cause substantial adverse impacts to or substantially lessened protections for any species on the preliminary list of potential plant SCC in the plan area because it will not cause the viability of any plant species on the list to be lost. None of the species evaluated are thought to be significantly impacted by the expansion or contraction of prairie dog colonies. There was no scientific evidence that any of the plant species are dependent on prairie dogs for habitat creation and maintenance or that any of the species are particularly vulnerable to herbivory by prairie dogs. Table D-6 gives best available scientific information for indicators as to species' capability to persist in the plan area over the long term (FSH 1909.12.52(d)(3)(f)(1-4).

There are no management actions needed to support the key ecological conditions for potential plant SCC at this time. During the 2020 Plan Amendment process, no specific plan components were designed to protect individual species of conservation concern or species coteries. During Land and Resource

Management Plan revision these species will be re-evaluated to determine their capability to persist in the plan area over the long-term and new plan components may be proposed at that time (as long as species continue to meet Forest Service Handbook minimum initial requirements for consideration as potential Species of Conservation Concern).

Table D-6. The following indicators summarize the potential for the preliminary list of potential plant species of conservation concern to persist over the long-term in the plan area (FSH 1909.12.52(c) and FSH 1909.12.52(d)(3)(f)(1-4)) and give the Responsible Official's determination if adverse impacts or lessened protections for each species rise to the level of "substantial" (81 Federal Register 90726), meaning actions could cause viability of the species to be lost. All species are native to and established (or becoming established) in the plan area, with observations and/or collections made within the last 20 years.

Scientific Name	Responsible Official determination: will there be substantial adverse impacts or substantially lessened protections as a result of the plan amendment?	Declining trends in population or habitat?	Restricted range?	Low population numbers or restricted ecological conditions?	Significant threats?
Aristida oligantha	**No** – Although this species is known to colonize disturbed sites, it has not been found in the mixed grass prairie ecotone or associated with disturbance from prairie dogs.	**No** – Species trends are not known, but habitat trends appear stable.	**No** – Extensive range, including most of the Great Plains.	**No** – Low in WY but on periphery of range. Population numbers high in other parts of the range. Ecological conditions do not seem restricted and habitat availability in the plan area is moderate.	**Insufficient information** – Competition from non-native species likely poses a threat. Climate change may also threaten this annual species, but no documentation exists.
Astragalus barrii	**No** – Occurs within the range of black-tailed prairie dogs but prairie dog colony expansion (or contraction) is unlikely to affect established populations due to differences in soil type preferences and areas of occupancy.	**Yes –** Species thought to be in moderate decline due to extraction activities and other development in the Powder River Basin.	**Yes –** Extremely restricted range, limited to the Powder River Basin and badlands.	**Yes –** This species can be locally abundant on parts of the TBNG, but the ecological conditions in which this species occurs are restricted to particular soil types, vegetation, and landform combinations that are not well understood and thus populations are scattered and difficult predict on the landscape.	**Yes –** Energy development including coal mining and coal bed methane, road construction, off-road vehicle use, competition from invasive plant species
Astragalus racemosus var. *racemosus*	**No** – Known distribution of species on plan area does not overlap with mapped preferred or marginal prairie dog habitat.	**Insufficient information** – Information lacking but habitat trends appear stable.	**No**– Extensive range, including most of the Great Plains.	**Yes** – Population numbers low in plan area, but WY on periphery of range. Population number high in other parts of the range. Habitat availability in the plan area likely moderate.	**Yes**– Competition from non-native species, specifically annual brome grasses.

Scientific Name	Responsible Official determination: will there be substantial adverse impacts or substantially lessened protections as a result of the plan amendment?	Declining trends in population or habitat?	Restricted range?	Low population numbers or restricted ecological conditions?	Significant threats?
Carex sartwelli	**No** – As a wetland obligate this species grows outside of prairie dog burrowing habitat. The one known population is also geographically separated from MA 3.63 and mapped prairie dog occupancy.	**Insufficient information** – Information is lacking but habitat trends likely stable.	**No** – Extensive range including much of northern North America.	**Yes** – Population number low in WY but on periphery of range. Population numbers high in other parts of the range. Insufficient information on ecological conditions/habitat availability in the plan area.	**Yes** – livestock grazing, competition from non-native species and indirect effects of climate change.
Chenopodium subglabrum	**No** – Species requires loose or partially moving sand and is found on alluvial terraces. Prairie dogs do not typically occupy sandy soils or soils with shallow water tables.	**Insufficient information** – Species trends are not known, but habitat trends appear stable.	**Yes** – Somewhat limited range within central North America but highly scattered, discontinuous distribution.	**Yes** – Population numbers low in Wyoming and low throughout its range. Habitat availability/suitable ecological conditions in the plan area are also low.	**Yes** – Non-native invasive species, natural succession in the absence of disturbance events (fire suppression).
Chenopodium watsonii	**Insufficient Information** – Early successional annual species that needs disturbance to persist. Found in natural erosional disturbances, anthropogenic disturbances, and on private lands in prairie dog occupancy areas. Unclear if disturbance from prairie dogs promotes this species, due to lack of scientific information, inventory, or research (range-wide or in plan area).	**Insufficient information** – Recent species and habitat trends in habitat are unknown.	**Yes** – Range restricted to scattered locations central North American, primarily parts of the Great Plains, desert southwest and Prairie provinces. Rare in the north half of the range.	**Yes** – Population numbers very low in Wyoming and very low in the plan area. Habitat availability/suitable ecological condition in the plan area not well understood, may not be very limited.	**Insufficient information** – Threats are not known/documented.

Scientific Name	Responsible Official determination: will there be substantial adverse impacts or substantially lessened protections as a result of the plan amendment?	Declining trends in population or habitat?	Restricted range?	Low population numbers or restricted ecological conditions?	Significant threats?
Nuttallanthus texanus	**No** – In the TBNG, this species tends to occupy loamy or saline upland ecological sites, which are highly preferred by prairie dogs. However, most of the known populations do not occur within the mapped area of suitable prairie dog habitat. Co-occurrence is likely incidental.	**Insufficient information** – Population trends are unknown. Habitat is likely stable.	**No** – Widely distributed throughout North America from British Columbia south to northern Mexico and northeast to Virginia. The TBNG occurrences are located near the central portion of its range-wide distribution.	**No** – There are 12 documented occurrences scattered across all regions of the TBNG. Population sizes are unknown but are likely highly variable over space and time. The species is known to occur across a diverse range of vegetation and site conditions; thus, the amount of suitable habitat on the TBNG is high.	**Insufficient information** – Energy development, fire suppression, and especially non-native plant species invasion, likely pose moderate threats. Climate change may also threaten this annual species, but no documentation exists.
Palafoxia rosea var. *rosea*	**No** – Habitat of sandy soil and shallow soils is unlikely to be prairie dog habitat.	**Insufficient information** – No information on population trends in the plan area. Habitat availability in the plan area is expected to remain stable.	**No** – The range of Palafoxia rosea extends south through the Great Plains in CO, KS, NM, OK, and TX. Populations on TBNG and elsewhere in WY are disjunct and form the northern edge of the range.	**Yes** – Population size and numbers are low in Wyoming. Population numbers moderate to high in other parts of the range, ecological conditions do not appear to be restricted and habitat availability on the plan area is high.	**Yes** – Energy development, fire suppression, invasive species.

Scientific Name	Responsible Official determination: will there be substantial adverse impacts or substantially lessened protections as a result of the plan amendment?	Declining trends in population or habitat?	Restricted range?	Low population numbers or restricted ecological conditions?	Significant threats?
Pectis angustifolia var. *angustifolia*	**No** – The species occupies sites with shallow and/or sandy/gravelly soil, which prairie dogs typically do not prefer.	**Insufficient information** – Population trends are unknown. Habitat is likely stable.	**No** – Has a scattered distribution throughout central North America. It is known mainly from the southern Great Plains, extending west into Utah and Arizona and south into northern Mexico. The TBNG occurrence is at the northern edge of its range-wide distribution.	**No** – There are 8 documented occurrences on the TBNG, all located within 5 miles of each other. Population sizes are small (mostly less than 100 individuals). The species has been found growing in clinker habitats on the TBNG but has the potential to occupy other sandy/gravelly sites within vegetation communities that are locally common; thus, there is likely a moderate amount of suitable habitat.	**No** – Energy development, non-native plant species invasion, and fire suppression likely pose moderate threats. Climate change may also threaten this annual species, but no documentation exists.
Phemeranthus parviflorus	**No** – Found in shallow soils that are not preferred by prairie dogs. Overlap in occurrences appears incidental.	**Insufficient information** – Species trends on in the plan area are not known.	**No** – Extensive, trans-Mississippi to the Intermountain region.	**No** – Population numbers are low in Wyoming but moderate to high in other parts of the range, ecological conditions do not appear to be restricted and habitat availability on the plan area is high.	**Yes** – Energy development, fire suppression, livestock grazing.

Scientific Name	Responsible Official determination: will there be substantial adverse impacts or substantially lessened protections as a result of the plan amendment?	Declining trends in population or habitat?	Restricted range?	Low population numbers or restricted ecological conditions?	Significant threats?
Polygala verticillata	**No** – The species prefers sandy sites, which prairie dogs typically do not inhabit. In addition, the only known location of the species is in the Spring Creek unit.	**Insufficient information** – Population trends are unknown. Habitat is likely stable.	**No** – Widely distributed across North America. Occurs from New England to Saskatchewan, south to Florida, Texas, and Utah. The TBNG occurrence is at the western edge of its range-wide distribution.	**No** – There is just one documented population on the TBNG (among 5 total in northeastern WY). However, the species may tolerate a fairly wide range of site conditions within vegetation communities that are locally extensive; thus, there is likely a moderate amount of suitable habitat on the TBNG.	**Insufficient information** – Energy development, non-native plant species invasion, and fire suppression likely pose moderate threats. Climate change may also threaten this annual species, but no documentation exists.
Rayjacksonia annua	**No** – Although this species is known to colonize disturbed sites and is found in the mixed grass prairie, it has not been associated with disturbance from prairie dogs.	**Insufficient information** – Species trends are not known, but habitat trends appear stable.	**No** – Ranges across parts of six Great Plains states, from Wyoming and Nebraska south to Texas.	**No** – Low in WY but on periphery of range. Population numbers high in other parts of the range. Ecological conditions do not seem restricted and habitat availability in the plan area is moderate.	**Insufficient information** – Energy development and non-native plant species invasion likely pose a threat. Climate change may also threaten this annual species, but no documentation exists.
Sisyrinchium angustifolium	**No** - This species prefers moist sites and wetland habitats which are unsuitable for prairie dog burrowing.	**Insufficient information** - Population trends are unknown, but habitat is limited.	**No** - Conflicting information exists about the western range of this species, but in the eastern mountains, east seaboard and the southern United States the species is widespread and abundant.	**Yes** – The species is restricted to specific wetland and wet prairie habitats and population numbers are low. There are only 2 documented populations on the TBNG and 2 in the vicinity.	**Insufficient information** - Potential threats include hydrologic changes, non-native plant species invasion, but no documentation exists.

Scientific Name	Responsible Official determination: will there be substantial adverse impacts or substantially lessened protections as a result of the plan amendment?	Declining trends in population or habitat?	Restricted range?	Low population numbers or restricted ecological conditions?	Significant threats?
Sporobolus compositus var. *compositus*	**No** – This species has a wide range of suitable habitat types that includes soils preferred by prairie dogs. However, there is no known overlap in habitat occupancy.	**Insufficient information** – Population trends are unknown. Habitat is likely stable.	**No** – Widely distributed across North America. Range includes the majority of the lower 48 states, plus adjacent Canada. The TBNG occurrence appears to be on the margin of the heart of its distribution in the central Great Plains.	**No** – There are just two documented populations on the TBNG, but more occur across northeastern WY. The species may tolerate a wide range of site conditions; thus, the amount of suitable habitat on the TBNG is high.	**No** – Energy development, non-native plant species invasion, and fire suppression pose moderate threats. Light-to-moderate disturbance may help maintain/promote the species. Often found in disturbed habitats.

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